ARMY, MARINE CORPS, NAVY, AIR FORCE

JTMTD

MULTISERVICE PROCEDURES FOR JOINT THEATER MISSILE TARGET DEVELOPMENT

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MULTISERVICE TACTICS, TECHNIQUES, AND PROCEDURES

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FOREWORD

This publication has been prepared under our direction for use by our respective commands and other commands as appropriate.

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PREFACE

1. Scope

This publication documents tactics, techniques, and procedures for conducting *Joint Theater Missile Target Development* (JTMTD). It establishes a common framework for soldiers, sailors, airmen, and Marines responsible for intelligence preparation of the battlespace (IPB), sensor employment, collection management, current and future operations, target development, and force application. This common framework will enable them to establish a comprehensive and coordinated approach for countering theater missiles (TM) through prelaunch attack operations against the entire target system. This publication's design recognizes that attack operations against TM is not a mission in itself, but a method of characterizing offensive operations regardless of mission area (e.g., counterair, interdiction, fire support, special operations, etc.) and is the responsibility of all forces.

2. Purpose

This publication is intended to help the joint force commander (JFC) and subordinate component commanders' staffs develop a cohesive approach to JTMTD. The term JFC as used in this publication implies a theater combatant commander (CINC) or subordinate JFC.

3. Application

The tactics, techniques, and procedures (TTP) described in this publication apply to all elements of a joint force. This publication uses approved joint and Service doctrine and terminology as its foundation. It identifies methodologies applicable to national, theater, and component staffs involved in these tasks and contributes to effective use of joint resources and expediting timely attacks. JTMTD focuses on the detailed requirement of intelligence and targeting processes to support attack operations but also residually provides support to active and passive defense.

4. Implementation Plan

a. Participating Service command offices of primary responsibility (OPRs) will review this publication, validate the information, and, where appropriate, reference and incorporate it in Service manuals, regulations, and curricula as follows:

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5. User Information

a. The TRADOC, MCCDC, NWDC, AFDC, and Air Land Sea Application Center (ALSA) developed this publication with the joint participation of the approving Service commands. ALSA will review and update this publication as necessary.

b. This publication reflects current joint and Service doctrine, command and control organizations, facilities, personnel, responsibilities, and procedures. Changes in Service protocol, appropriately reflected in joint and Service publications, will likewise be incorporated in revisions to this document.

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15 October 1999

JTMTD

Multiservice Procedures for
Joint Theater Missile Target Development

TABLE OF CONTENTS

EXECUTIVE SUMMARY

JTMTD

Multiservice Procedures for Joint Theater Missile Target Development

> "On the whole, offensive counter-measures to the flying bomb [V-1] brought no direct return commensurate with the great effort devoted to them. A bolder investment in that class of operation might have achieved much. But the Western Allies, hampered by their failure to make a clear-cut choice between the various courses of action open to them, never achieved the singleness of purpose which might have helped them to stake successfully on information that fell short of certainty.
>
> Basil Collier, *The Defence of the United Kingdom*

The quote for Basil Collier reminds us that conducting offensive operations against theater missiles has never been an easy task. The Coalition's troubles in finding Saddam Hussein's Scuds during DESERT STORM are reminiscent of the difficulties faced by the Allies in locating Nazi V-1 cruise missiles and V-2 ballistic missiles during World War II. Today our *National Military Strategy* recognizes that "the proliferation of theater missiles is one of the greatest dangers to US national interest and global security and will remain so into the foreseeable future." Joint Publication 3-01.5, *Doctrine for Joint Theater Missile Defense,* states "the preferred method of countering enemy theater missile (TM) operations is to attack and destroy or disrupt TMs prior to their launch." Recognition of the importance of this threat, the doctrinal preference for attack operations, and the historical difficulty in achieving successful attacks against TMs were the impetus for producing this publication.

Many of the problems in locating mobile missiles in the past can be traced to difficulties in obtaining timely information and organizing and filtering intelligence operations. This publication establishes a common framework for those individuals responsible for intelligence preparation of the battlespace (IPB), sensor employment, collection management, current and future operations, target development, and force application. This common framework will enable them to establish a comprehensive and coordinated approach for countering TMs through prelaunch attack operations.

The focus of this publication is Joint Theater Missile Target Development (JTMTD). **JTMTD is the synergistic outcome of allocating, integrating and synchronizing resources in order to identify and nominate selected targets in the TM target system for timely attack**. Achieving an effective JTMTD process is a challenge for operational forces. Applying the concepts discussed in this publication will facilitate the process.

Overview

Chapter I provides the reader an understanding of the difficulties associated in trying to find, track, and interdict TM forces. It discusses the joint force commander's (JFC's) influence in achieving a cohesive JTMTD effort (principally through training and dedication of resources). It highlights peacetime actions that are imperative to making the JTMTD process effective during crisis or conflict.

Threat Missile Systems

Chapter II provides the reader a basic understanding of the TM target system, generic operating phases, and some specific operating characteristics common to similar systems. It establishes the common framework necessary for the TM IPB development.

Strategies and Procedures

Chapter III explains how to achieve a coherent attack strategy against TMs. It provides a detailed description of how to conduct TM-specific IPB, collection management, and target development processes to achieve the defined objectives.

JTMTD Integration Options

Chapter IV describes options available to the JFC for integrating and synchronizing TM intelligence, collection, and targeting efforts. The four methods discussed in detail are consolidation, collaboration, exchange of liaisons, and collocation.

KEY JTMTD POINTS TO REMEMBER

- Preventing TM launches requires the entire TM target system to be attacked simultaneously and continuously.
- TM IPB must begin in peacetime to succeed in conflict.
- Successful TM IPB comes from knowing the enemy; therefore, it is imperative that analysts who will take it to war help in its creation.
- Collection managers must understand the threat *equally as well as* analysts; otherwise, the collection effort will be unfocused.
- Every TM event provides a clue--apply knowledge learned from each event to develop the IPB.
- Crosscueing of sensors is imperative to timely target development.
- Avoid the temptation of fixating on killing TELs. Stay focused on neutralizing the enemy's launch capability.
- Transload operations are *excellent* targets, but forward operating locations/bases (FOLs)/FOBs) are *outstanding* targets.
- **Operational decision makers must understand the JTMTD process too!**

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Chapter I

OVERVIEW

> *From the beginning to the end of the war, Scuds introduced a serious friction into the conduct of the air campaign—one that did not affect the final outcome, but only due to the absence of any other Iraqi successes. There is, moreover, a larger issue: the question of might-have-beens. Except for the hit at the war's end that killed a large number of U.S. Army reservists, the Scuds achieved little damage and few deaths. Nevertheless, a Scud nearly hit the USS Tarawa, while that ship was tied up at the main dock at Dhahran—a dock piled high with ammunition. It does not take much imagination to visualize what an actual hit might have achieved in political and psychological terms.*
>
> *- Gulf War Air Power Survey*

1. Background

Ballistic, cruise, and nontactical air-to-surface missiles have been a threat to the United States (US) and its military operations for over 50 years. During the Cold War, the strategic balance and deterrence created by the theory of mutually assured destruction (MAD) between Soviet and US forces held this threat in check. The value of retaliation as a deterrent to rogue states has waned in the post-Cold War era as theater missiles (TMs) have proliferated.

The military arsenals of nations worldwide are becoming stocked with an expanding number and variety of missile systems. Most are imported, some are developed domestically, and a few are indigenously modified. Missile threats emanate primarily from developed first-tier and emergent second-tier countries armed with missiles that can range from 30 to greater than 3000 kilometers. Some countries possess hundreds of fixed and mobile missile launchers. Although they currently pose only a regional threat, the trend is clearly towards systems with greater range, lethality, accuracy, and sophistication.

TMs appeal to developing nations for a variety of reasons and are often considered symbols of national stature. TMs enable rogue states to strike deep into neighboring nations, placing the populace as well as that government's forces at risk. Compared to other weapon systems, TMs' relatively long range, short time-of-flight, low cost, and flexibility in carrying a variety of warheads provide numerous political and military advantages. TMs also appeal to developing nations because defenses against them are not as mature as defenses against other weapons systems. Our *National Military Strategy* recognizes that "the proliferation of theater missiles is one of the greatest dangers to US national interest and global security and will remain so into the foreseeable future."

2. The Case for Prelaunch Attack Operations against Theater Missiles

No nation in any war has ever effectively countered TMs by reactively attacking missile launchers. There are many parallels between the allied efforts during World War II (WWII) to counter Hitler's V-1/V-2 rockets and the Coalition's efforts to counter Saddam Hussein's Scuds during the Gulf War. The vignettes cited throughout this publication reinforce one key point—mobile long-range missiles provide an adversary an asymmetric

means of leveraging military operations. That is, the "owner" of TMs can choose to use them politically or tactically against strategic, operational, or tactical targets; can make that decision at the last minute; and change how they intend to use them daily. Although the less sophisticated variety of TMs may not be very effective tactically, even the hint of using them to deliver weapons of mass destruction (WMD) makes them significant threats.

Relying 100 percent on defensive measures to protect friendly forces is not only a gamble; it also relinquishes the initiative to the adversary. Prelaunch attack operations against TMs are vital to protecting friendly forces and their freedom of action. Enemy missiles can quickly disrupt deployment operations and consume operational forces in counter TM efforts. While defensive measures are essential, so too are prelaunch attack operations that reduce the volume of incoming missiles and put the adversary's TM forces at risk.

Because adversary TM forces use dispersed operating patterns and employ deception efforts to hide their operations, finding and destroying launchers is a daunting task. Not only are these operations easy to hide, but they do not confine themselves to one segment of the battlespace. Unlike most threats, TMs can cut across all boundaries to threaten any aspect of military force or political objective in a matter of minutes. Also, missile launches tend to cause considerable anxiety up and down the national chain of command, often prompting an urge to respond.

Countering TMs has proven difficult for a variety of reasons, including insufficient sensors capable of detecting missiles in prelaunch operations, an inability to unequivocally identify TMs other than through actual launch indicators, and an inability to task assets in time to strike targets when found. Because of these shortcomings, attack operations have gravitated toward reactive responses; however, reactive attack operations are not the desired method. Joint Publication 3-01.5, *Doctrine for Joint Theater Missile Defense,* states "the preferred method of countering enemy TM operations is to attack and destroy or disrupt TMs *prior to their launch*."

Preventing enemy launch operations requires a comprehensive strategy that targets the enemy's entire TM system—from launch platforms and ground support equipment (GSE), to command and control (C2) nodes, missile stocks, and TM infrastructure. Implementing an effective TM attack strategy depends on many things, but none more important than timely, predictive intelligence. US forces have proven much more capable of attacking TM targets than in locating them. While destruction of the missile transporter-erector-launchers (TELs) can be a significant piece of an overall TM attack strategy, it must not be the sole focus. The broad goal of "preventing launch" must remain the watchword. **One of the key vulnerabilities of mobile TMs is that they must move, bringing together elements in order to achieve launch. Finding ways to prevent the various elements of the target system from coming together and operating as a whole is the key to developing a successful attack strategy.**

As previously noted, successful prosecution of TMs cuts across many boundaries and levels of command—national to tactical. This applies to the intelligence community as well. Because TM intelligence information is extremely perishable in nature, the window of opportunity to collect and exploit information is usually very short. This means that unless the intelligence and collection architectures are focused and responsive, vital information

can be completely lost. TM intelligence preparation of the battlespace (IPB) requires an extensive intelligence effort and must be well coordinated long before hostilities commence. A piecemeal, under resourced, or ad hoc TM intelligence effort can and does lead to missed cues, missed information, or, at the very least, delayed responses to TM activity indicators. TM intelligence centers at each echelon must work collaboratively to avoid creating conflicting intelligence requirements.

3. The Case for Joint Theater Missile Target Development

Target development is the systematic evaluation of potential target systems, individual targets, and elements of each target for military, economic, and political importance and is a critical part of the 6-step joint targeting process (Figure I-1). Target development is driven by the joint force commander's (JFC's) objectives and guidance and is continually adjusted by combat assessments (CAs).

Figure I-1. Joint Targeting Process

This publication focuses on a singular target system—theater missiles. Joint theater missile target development (JTMTD) is not a separate targeting process but works through the established targeting and intelligence structures (joint targeting coordination board [JTCB], joint intelligence center [JIC], etc.) to achieve effective TM target nominations to satisfy the JFC's objectives. For more information on the targeting process see Joint Publication 2-01.1, *Joint Tactics, Techniques, and Procedures for Intelligence Support to Targeting* or Multiservice Tactics, Techniques, and Procedures (MTTP), *The Joint Targeting Process and Procedures for Targeting Time-Critical Targets.*

…"Effective attack operations require real-time coordination between all component commanders as well as continuous wide-area surveillance over the entire theater/joint operations area (JOA), with emphasis on enemy missile systems and likely support, fabrication, assembly, and launch areas. Coordination of attack operations involves the detection, acquisition, and identification of enemy TMs and the dissemination of the targeting information to the designated attack system for execution. These tasks are directed to subordinate elements as missions for execution."

Joint Publication 3-01.5

Current doctrine recognizes the fact that we fight as Service or functional components within the framework of a joint force. However, doctrine provides only broad guidance and does not provide the required details to deal with elusive TM threats. Current technology also does not provide the kind of "interoperable communications and software" necessary to develop a commonly shared, near-real-time TM intelligence picture supported by an integrated, robust collection effort. This manual seeks to address means to cope with these shortcomings.

This publication focuses on integrating TM IPB, collecting/sensoring management, and targeting processes to achieve effective TM target nominations. JTMTD is a process derived from the synergistic outcomes of allocating, integrating, and synchronizing resources in order to identify and attack selected targets within the TM target system. Only with a commonly shared perspective of the enemy TM force and aggressive collection management effort will the joint task force (JTF) be able to achieve a coherent and effective TM attack strategy. This can only be achieved when the JTMTD processes are commonly understood by analysts, collection managers, targeteers, and, most importantly, operational planners and decision makers.

4. JFC Influences

As noted in joint doctrine, the role of the JFC in organizing forces is the first step towards successful JTMTD efforts. Besides structuring the JTF, the JFC establishes theater specific guidance and objectives and disseminates them to subordinate commanders through mission-type orders. These orders help define command relationships to facilitate mission accomplishment. The guidance and objectives are the "guideposts" subordinate commanders and staffs use to prepare, coordinate, and execute their assigned responsibilities.

a. Peacetime JFC Considerations. JFCs take many actions to prepare their components for war, among the most critical for JTMTD is joint training. Exercising TM attack operations and the inherent JTMTD processes is essential. Only by training as we intend to fight can we find and correct deficiencies in interoperability of equipment and tactics, techniques, and procedures (TTP). Every training opportunity should seek to improve working relationships among elements tasked with countering TMs and refining theater JTMTD TTPs. The second action the JFC can take during peacetime affecting JTMTD is to dedicate resources (that is, time, personnel, collection resources, etc.) to TM IPB development. The work required to develop the TM intelligence database is voluminous. The JFC must use every means available to include national intelligence and

combat support agencies (such as, National Security Agency [NSA], Central Intelligence Agency [CIA], National Imagery and Mapping Agency [NIMA], Missile and Space Intelligence Center [MSIC], Defense Intelligence Agency [DIA], etc.) to ensure friendly forces have the best information available regarding the adversary's missile forces, capabilities, and intentions. **The depth of peacetime TM IPB development will greatly influence whether attack operations during conflict are prelaunch focused or reactive in nature.**

> *"The JFC will normally task component commanders for conduct of attack operations against TMs within their assigned area of operations (AO). Additionally, when ground forces have been deployed and if a joint force air component commander (JFACC) has been designated,* ***the JFC will normally task the JFACC as the supported commander to plan for and conduct, as apportioned, attack operations against longer range TMs outside the other component commanders AO. The JFACC should also plan for and maintain visibility on the theater/joint operations area (JOA)-wide attack operations effort.***
>
> Joint Publication 3-01.5

b. JFC Considerations in Crisis and Conflict. As tensions rise and hostilities begin, the joint force must be prepared to quickly leverage available assets to develop the TM intelligence picture in detail. When indications and warnings point towards the use of TMs and/or WMD, the JFC may be required to accept risk by making tradeoffs in other areas (such as, shifts in resources away from major operations, changes in special operations forces (SOF) locations, diversion of sensors, changes in time-phased force and deployment data [TPFDD] flow, etc.). As a crisis escalates, prioritization of intelligence requirements (IRs) and corresponding management of reconnaissance, surveillance, and target acquisition (RSTA) assets will become critical. The focus of JTMTD efforts throughout must be on providing the JFC the best TM intelligence picture and most viable attack strategy possible.

5. Peacetime Imperatives

a. TM IPB. The commander uses the IPB process to clearly understand the capabilities, intentions, and possible actions of the adversary. IPB also helps leaders understand the effects of geography, weather, demographics, and culture(s) on enemy and friendly operations. Key requirements for TM IPB that must occur during peacetime are—

(1) Collecting data and supporting material (on terrain, equipment, doctrine, communications, lines of communication [LOC], etc.).

(2) Conducting TM IPB using available information in coordination with DIA, CIA, NSA, and other agencies.

(3) Collecting imagery to validate and refine database information.

(4) Defining intelligence gaps and preparing IRs.

(5) Conducting area delimitation analysis of potential TM operating areas.

b. Collection Management (CM).

Peacetime development of TM IPB is dependent upon collection efforts and the CM process. TM collection priorities must be integrated into the joint force's overall collection strategy. Equally important is to plan for the employment of additional RSTA assets during crisis and conflict. This requires identifying assets needed to support JTMTD efforts and developing "on-the-shelf" collection plans so that when tensions rise, collection efforts can be quickly expanded.

The roles and responsibilities of supporting components and organizations should be specified and should include the procedures for dynamically retasking sensors to meet unanticipated priority intelligence requirements (PIRs). Collection Management Authority (CMA), Collection Requirements Management (CRM), and Collection Operations Management (COM) duties need to be assigned and responsibilities clearly delineated.

Key requirements for on-the-shelf collection plans are—

(1) Incorporating TM IPB-defined IRs for each phase into the JTF's overall priority intelligence requirements for JFC approval.

(2) Identifying, within each intelligence discipline, available collection systems to support TM intelligence and target development during crisis and conflict stages.

(3) Examining anticipated available systems for correct sensor mix and ensuring they are capable of providing the information required at the right time and place. Identifying potential cross-cueing requirements required to support TM collection efforts.

(4) Developing collection priorities for sensors based on the JFC approved priorities, projected availability of RSTA assets, and probable combat and intelligence operations. If TM IRs are not a top priority, examining planned sensor flight tracks for residual collection opportunities.

c. Target Development.

Targeteers should be actively involved in developing targeting data against known TM targets. These will be primarily infrastructure-related targets, such as TM manufacturing facilities, TM import facilities, missile storage facilities, chemical and biological weapon production facilities, liquid and solid fuel production facilities, lines of communications (LOC) (road, rail, communications, waterways, etc.), and garrison locations of TM missile forces.

Key requirements for target development are—

(1) Working with intelligence analysts to determine the enemy TM target system's vulnerabilities and exploitable decisive points. Exploring these weaknesses to develop a TM attack strategy against the entire target system.

(2) Assisting in conducting countermobility analysis to determine potential

targets that will prevent or disrupt TM components from coming together (for example, interdiction of choke points), with a goal towards defeating the enemy's ability to achieve missile launch.

(3) Looking for opportunities to use nonlethal means to disrupt launch operations, such as use of electronic warfare to disrupt signals.

6. Conclusion

Preventing an adversary from launching TMs requires a cohesive and well-coordinated joint effort. **Disrupting the enemy missile force's ability to generate and sustain missile launch operations requires JTMTD TTPs be refined and integrated into peacetime training.** The processes of JTMTD are the foundation for developing a comprehensive TM attack strategy and for conducting deliberate and time-sensitive attack operations against the entire TM target system. The goal of this publication is to establish a common perspective on this process.

Similarities in WWII and the Gulf War

Reports and prisoner of war debriefings obtained at the end of World War II indicate that the Allies' strenuous efforts to attack the small, dispersed V-1 flying bomb launch sites and mobile V-2 ballistic missile launching units did not have any significant influence on the rate or volume of V-weapon fire. The principal limiting factor on Nazi missile operations was the level of production that could be sustained at the weapon manufacturing facilities in the Third Reich.

There is a direct comparison between the effect of the Scuds in the Gulf War and the effect of the Nazi V-1/V-2 campaign in the last years of World War II. The Nazi missiles possessed no great accuracy but were nevertheless able to draw off considerable resources from the Allied strategic bombing campaign, tactical air efforts, and aerial photo-reconnaissance operations. The British government feared, quite rightly, that the explosion of large numbers of V-1/s in southern England might have a serious impact on the morale of the population and its willingness to see the war through to a successful conclusion. In the end, Allied air and ground forces mastered the threat but only after the expenditure of resources far in excess of what the Germans devoted to their program.

Many of the following tactics used by the Nazis to defeat Allied attack operations efforts ring familiar to those employed by Saddam Hussein's forces during the Gulf War:

- (V-1) The presence of large numbers of decoy launchers.
- (V-1/V-2) Extensive use of camouflage, concealment, and natural cover.
- (V-1/V-2) Dispersal of the launch forces into small elements.
- (V-1) Preparation of excess launch capacity to buffer launcher losses.
- (V-2) Mobile launch unit operations, including the following:
  - Redeployment to entirely new operating areas.
  - Day-to-day switching between multiple, randomly-situated launch sites.
  - "Shoot and scoot" launch tactics.
- (V-2) Low-volume, low-rate missile firing that minimizes launch unit exposure.
- (V-2) Sheltering launch operations in areas populated by civilians.
- (V-1/V-2) Launch operations conducted during bad weather or at night.

Both Nazis and the Iraqis proved that a country can preserve its theater missile launchers through the use of simple and well-chosen tactics, despite the fact that country's opponents may have won air supremacy over the missile unit operating areas.

--Dr. Ron Allen, Sandia National Lab
based on *United States Strategic Bombing Survey*, January 1947

Chapter II
THEATER MISSILE SYSTEMS

> *"The Fuehrer and I have squared off the most rewarding targets on the map of London. Twice as many inhabitants are crammed into London as Berlin. For three and a half years they have had no sirens. Imagine the terrific awakening that's coming! Our weapons [V-1/V-2} are absolutely unprecedented. There is no defense, no warning at all. Wham! It hurtles down into the city, all unaware! I cannot picture a more devastating attack on their morale…"*
>
> Dr. Joseph Goebbels, Nazi Minister of Propaganda, quoted by David Irving in *The Mare's Nest*

1. Background

TMs are defined as ballistic missiles, cruise missiles, and air-to-surface missiles (not including short-range, non-nuclear, direct fire missiles, bombs or rockets such as Maverick or wire-guided missiles). Their target is within a given theater of operation. TMs have unique capabilities that must be considered when planning countermeasures. For example, no other target system can put a warhead into the theater rear area or threaten neutral countries in a matter of minutes. Other target systems do not create public panic and a political situation each time a launch is broadcasted on television worldwide by reporters wearing gas masks. These unique traits, coupled with the elusive nature of the TM target system, require the dedicated attention of determined, knowledgeable professionals to effectively counter the threat.

Modern TMs have very long ranges and can launch a variety of warheads, including high explosive; nuclear, biological, and chemical (NBC); etc. They are also currently difficult to counter. Because they are relatively cost effective weapons, ballistic missiles are weapons of choice for many developing nations. Such weapons provide an offensive capability and, when mated with a warhead of mass destruction, give a nation the ability to deter a potential adversary by holding population centers and/or military forces at risk. Rogue nations believe TMs provide them with a counter to sophisticated land, air, and naval forces. As a result, nations around the world are actively pursuing missile capabilities.

TMs may be used alone or in conjunction with other weapon systems. Their targets can vary from political to military, such as population centers, ports, airfield, headquarters, air defense sites, command and control (C2) elements, communications nodes, and logistic centers. They can quickly put key civilian facilities at risk, such as power and water stations, petroleum pumping and storage sites, and industrial complexes. Ballistic and cruise missiles also present a serious threat to merchant shipping, critical sea-lanes, and maritime operations in joint littoral warfare, as well as key offensive and defensive forces/ complexes and support organizations. Air-to-surface missiles have also proven to be effective weapons against point targets, and they are difficult to defend against.

2. Generic Architecture

Although there are many variables between the different types of TMs, they generally share a common architecture. Countries possessing TMs either import them, reverse-engineer them and/or develop their own technology. Common aspects of all TM programs are--

a. Research and Development (R&D). If a country is developing its own missile system(s) or adapting a system purchased from another country, there will be a center, institution, and personnel responsible for the R&D effort. However, if a country purchases the complete TM system, there may be no R&D effort.

b. Manufacturing. Countries that develop their own systems or adapt those produced by other nations require dedicated manufacturing and testing facilities. They may also have to develop or refine the fuel for the missile systems. Although the fuels are of a specific type, they are commonly available on the international market from several sources.

c. Import. Countries that purchase systems from other nations will have prepared sites for receipt of missile system components and fuels. These ports of entry may be air-, land- (road or rail), or sea-based. These locations must have receipt, inspection, and storage capabilities. If the equipment requires assembly, there may be facilities created nearby to support these activities.

d. Transportation. TM components must move from their manufacturing or importing site by rail, road, air, and/or sea to garrison or permanent storage sites.

e. Missile Storage. Missile storage locations are required at the point of manufacture, at the point of receipt, in TM unit garrison locations, and at training installations. Missile storage sites are likely to be constructed and developed within projected operational areas as well.

f. Warhead Storage. Warhead storage sites are usually located in ammunition areas and may not be easily discernible from bunkers holding other munitions. However, WMD warheads require specialized storage, handling and, most notably, higher security.

g. Garrison. TM units are usually garrisoned at military bases. Most training and equipment maintenance occurs at these locations. Land-based units will likely move from their garrisons to conduct combat operations. Air and naval TM units may conduct wartime operations directly from their home air base or port facility.

h. Dispersal. During peacetime training or conflict, TM forces move from garrison or permanent storage sites to operating areas. These areas may include training areas, forward operating bases (FOB), staging bases, hide locations, or air bases. The missiles are normally transported on a TEL, or they can be moved by railcar or covered truck. For cruise missiles and air-to-surface missiles, aircraft may move to designated dispersal or staging bases, while ships may move out of port to a designated operating area.

i. Assembly Areas. In most cases missiles and warheads are shipped and stored separately. One of the final stages of preparing the weapon for launching is mating the warhead to the missile body. This applies to training and combat operations.

j. Launch Areas. TM attacks normally take place from preselected launch areas. The characteristics of the launch areas are dependent on missile-type. Ballistic missiles usually start from a hide position then move to the launch area. Aircraft and naval vessels usually proceed directly to a preselected launch area from their bases.

k. Launch Preparation. After arrival at a launch area, most ballistic missiles require some prelaunch preparation. These activities may involve fueling and testing the missile and warhead components along with some assembly operations. Launch preparations for liquid-fueled TMs generally require longer set-up/check-out time than do solid fuel missiles. For cruise missiles and air-to-surface missiles, these activities will likely occur at an airfield or port and may involve simply moving the missile from a storage area to a delivery platform (aircraft or naval ship).

l. Command, Control, and Communications (C3). Planning TM operations is normally a highly centralized process with tight control over the employment and selection of targets. Execution of TM operations may be either centralized or decentralized. The degree of centralization is generally determined by the amount of control desired by civilian or senior military leaders, the capability for secure radio or hardwire communications, the ability of the opposing forces to detect or locate transmitters, and the tactics employed. WMD-armed missiles will be tightly controlled because of their political sensitivity and the possibility of retaliation. Thus, WMD-associated TM units will normally require robust communication links or constant communication with national leadership for launch authorization.

m. Support Units. Most TM systems require an extensive support system. Support units provide a variety of functions to include maintenance, rearming and refueling, personnel replacement, etc. They also deliver replacement warheads and missiles and conduct all the electronic testing and repair. During peacetime, these units will probably be collocated with the TM firing units in garrison. In wartime, they may disperse to FOBs or forward operating locations (FOLs), dispersal/staging airfields, or naval operating areas.

3. Theater Ballistic Missiles (TBMs)

a. **Definition**. TBMs or surface-to-surface missiles are characterized by their trajectory, having one or more boosters and an initial steering vector. They have a range of 30 to greater than 3300 kilometers (50 to 2000 miles) and can travel this distance in 5 to 20 minutes. Once launched, ballistic missiles are guided to their preselected targets using gyroscopic assemblies.

b. **Threat Employment Concepts**.

(1) Prime strategic targets for ballistic missiles are large, soft, heavily defended, and deep rear area facilities that are critical to a nation's warfighting ability. Examples include airfields, air defense sites, transportation centers (ports and airfields), logistical hubs, and national command and control nodes. Additionally, key population centers are

prime targets whose attack might create panic among the populace and foster a political crisis. TBMs may also be used in a tactical sense to affect battlefield logistics and operations; although, this is less likely given the strategic importance of such weapons to developing nations.

(2) Mobility enhances TBM survivability and, conversely, complicates targeting efforts. Their long range affords the enemy increased options in selecting operating areas and determining potential targets. TBMs have been exported by many nations (the Scud and its derivatives being the most common). The Scud employs the full spectrum of warheads. The Scud, as well as the Soviet designed SS-21 Scarab, can be set up and fired in less than 45 minutes and subsequently relocated within minutes. Some modified versions of the Scud missile have demonstrated a tendency to break up during terminal phase descent; this break up further complicates defensive efforts.

(3) Surface-to-air missile systems have been modified into surface-to-surface missiles (SSM) in China and South Korea. This trend will likely spread to other nations. As missile systems and missile technology proliferate, nations will acquire or be able to produce missile systems using solid fuels. This will significantly reduce the dwell time required for system checks and fueling during launch preparation. This reduced dwell time will significantly reduce the TMs signature and the time available for preemptive attack operations.

c. **Threat Employment Operations**.

(1) TBM operations are generally broken down into five major phases. These include readiness, deployment, employment, sustainment, and reconstitution. Figure II-1 depicts of the phases.

(a) Readiness Phase. The readiness phase encompasses normal day-to-day peacetime operations. During this phase, TBM forces train on wartime tasks and practice doctrinal employment in the local training areas (LTA) or in garrison. This normally entails missile erection, site preparation, TEL operations, and missile maintenance. Support units will perform maintenance on firing units and conduct resupply operations.

(b) Deployment Phase. The deployment phase may include initial movement from the garrison location(s) to the initial war fighting positions to support established objectives. TBM force deployment will depend on the range to the target, missile capability, terrain, and survivability considerations. Firing units will move to either hide positions or directly into launch positions. Support units will likely move to a FOB or FOL and from there conduct support to transload operations. (Note: ***Deployment may or may not convey hostile intent, depending upon the circumstances.***)

(c) Employment Phase. The employment phase encompasses initial combat operations. During this phase, TELs move missiles to their initial firing positions from a hide site and then, after launch, move to another hide site or directly to transload operations, depending on the threat. The support unit will establish the transload location based upon doctrine, terrain, the TBM force commander’s firing schedule, and the threat.

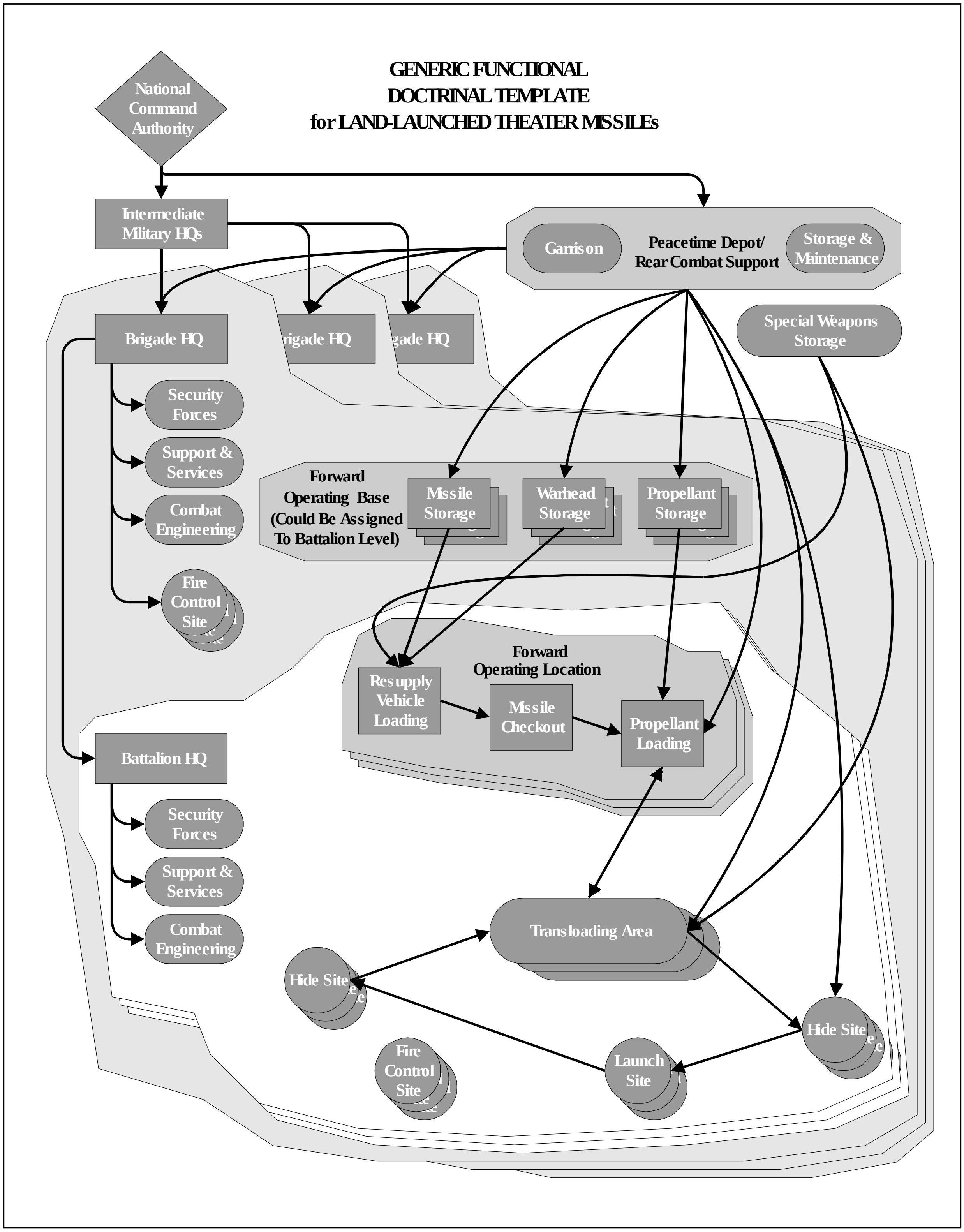


Figure II-1. Theater Employment Operations

(d) Sustainment Phase. During the sustainment phase, support units will likely use a FOB or FOL to conduct the necessary repair/replacement operations to sustain the TBM force. Sustainment operations require support units to use LOC from garrison locations, field storage areas, and/or the manufacturing infrastructure/import facilities to the FOB and forward.

(e) Reconstitution Phase. The reconstitution phase encompasses continuous operations between firing units, support units, and higher echelon logistics locations to regenerate TBM forces.

d. **Threat Employment–TTPs**.

(1) TEL Operations. TELs serve as the transporter and launch platform for missiles. The most common TEL is the Soviet era MAZ-543. TELs present a small, extremely mobile target with very short dwell time. The MAZ-543 has tremendous off-road mobility and can easily hide. TELs generally travel only short distances between hide sites, launch sites, and transload sites, unless required to return to the FOB or FOL for additional maintenance. A TEL will be in launch configuration for a very short period of time and can displace to a new hide site in a matter of minutes.

(2) Transload Site. The transload site is where fueled, ready missiles are loaded onto TELs. Support unit personnel, vehicles, and equipment from the FOB or FOL rendezvous at this site with firing unit TELs. At this site there are generally a number of vehicles: missile resupply vehicles (with one to three missiles), a crane (possibly attached to the resupply vehicle), and other GSE as required by the missile type. Figure II-2 shows an example of the GSE required to support a SS-1 launch. GSE likely may not have great off-road mobility; in such cases, transload sites will likely be only a short distance from improved roads. The transload site is usually an open area large enough to allow the crane to lift/pivot the missile onto the TEL, approximately 50 by 50 meters. This operation can occur in large buildings or underground facilities with sufficient height, approximately 20 meters. When detected, this site will remain vulnerable throughout its established dwell time.

(3) FOL. A FOL is typically where warheads and missiles are mated, missiles are fueled, and missiles are loaded onto the resupply vehicle. A FOL remains in place from half a day to 3 days. The FOL usually contains warheads and missile airframes, transporters, cranes, checkout vehicles, fuel trucks (vehicle and missile fuel), and resupply and other support vehicles. FOLs can be located in rural or urban settings, and may be hidden in a building complex or underground facility. The FOL has a larger footprint than TEL or transload operations but is still difficult to locate. Some countries may not employ FOLs, preferring to conduct these operations out of the FOB.

(4) FOB. The FOB is the main TM unit supply and storage activity and will be spread out over a large geographic area for survivability. The number of FOBs will depend on the size of the missile force (targets selected and acceptable travel distances for support units). In situations where a country's geographic area is small, it is possible that operations typically associated with the FOB could be conducted from garrison.

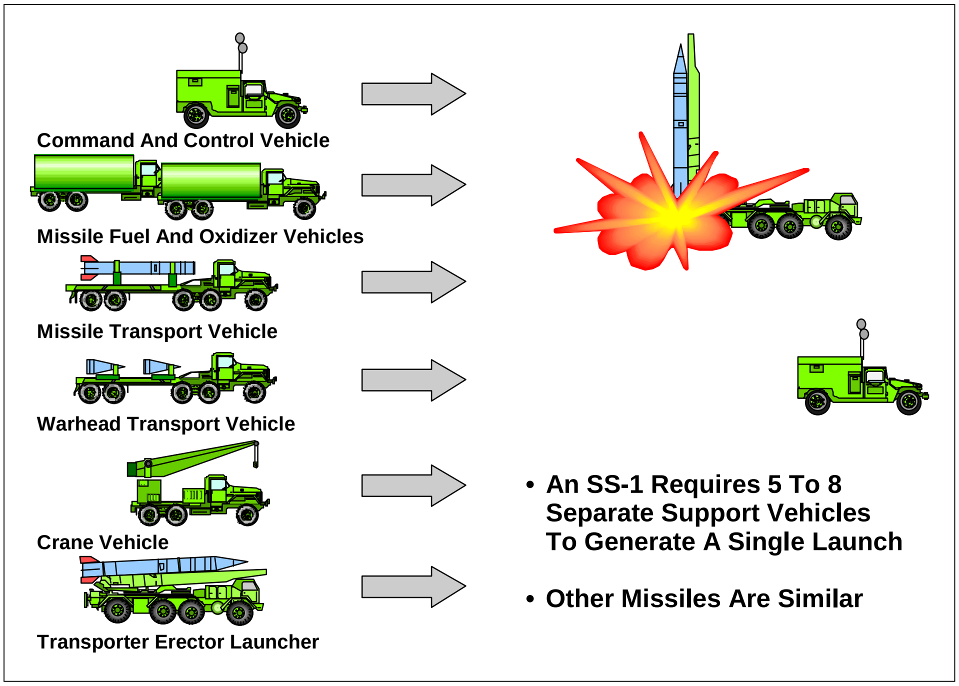


Figure II-2. Vehicles Required to Generate an SS-1 Launch

(a) A typical FOB contains warhead, missile and propellant storage sites; transporters and cranes; checkout vehicles; fuel trucks (vehicle and missile fuel); and resupply and other support vehicles. An FOB can be established in an urban environment hidden in large buildings or underground facilities or in the field. The FOB will normally deploy GSE to FOLs and/or transload sites as needed to sustain launch operations. FOBs require robust LOCs (primarily roads and rail lines) to support continuous operations.

(b) **The FOB cannot be easily hidden, but may be difficult to distinguish from other logistics facilities.** Once established, the FOB will probably not be moved in total, but certain components may be moved to complicate detection, create a deception, or facilitate launch operations.

e. Graphic Presentations. Figures II-3 through II-6 depict the typical flow of TM (both TBM and ground launched cruise missile) elements into a national level TM infrastructure.

4. Cruise Missiles

a. Definition. Cruise missiles are defined as a guided missile, the major portion of whose flight path to its target is conducted at approximately constant velocity, and depends on the dynamic reaction of air for lift and upon propulsion forces to balance drag. A cruise missile is an unmanned, self-propelled vehicle that sustains flight through the use of aerodynamic lift over most of its flight. Cruise missiles usually navigate autonomously to the targets and depending on their sophistication can position themselves through a number of update methods along extended flight routes. Cruise missiles are capable of delivering the full complement of warheads; from conventional to WMD.

b. Threat Cruise Missiles.

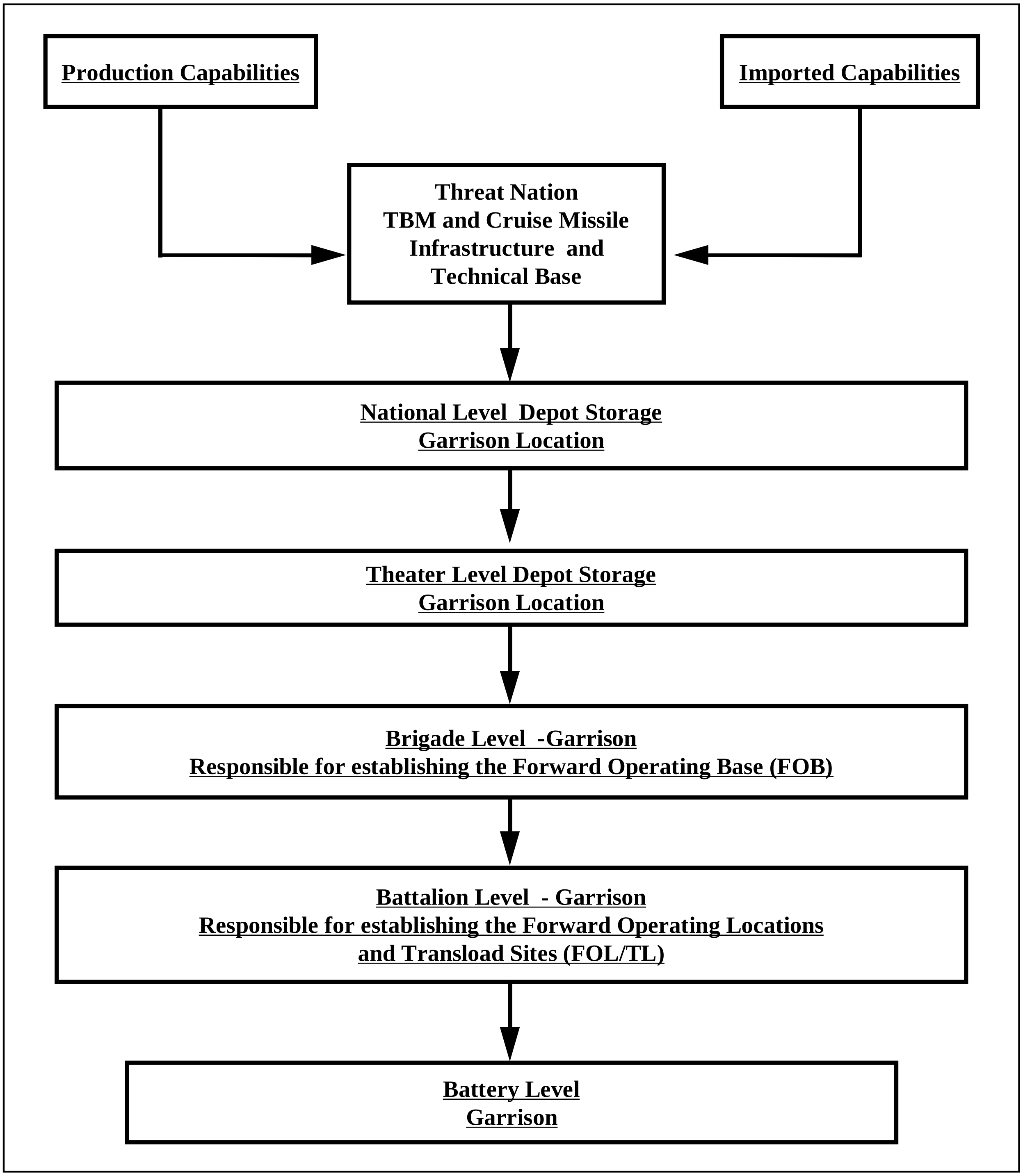


Figure II-3. Typical TM "Flow" National to Tactical

(1) Very few nations currently possess sophisticated cruise missiles, such as the US Navy Tomahawk land attack missiles (TLAM) or US Air Force (USAF) conventional air launch cruise missile (CALCM). Employment by developed nations has been limited. The majority of cruise missiles in potential threat nations are short range Anti-Ship Cruise Missiles (ASCM) with ranges up to 100 nautical miles, such as China's Silkworm. Some countries are modifying ASCM for a land attack role.

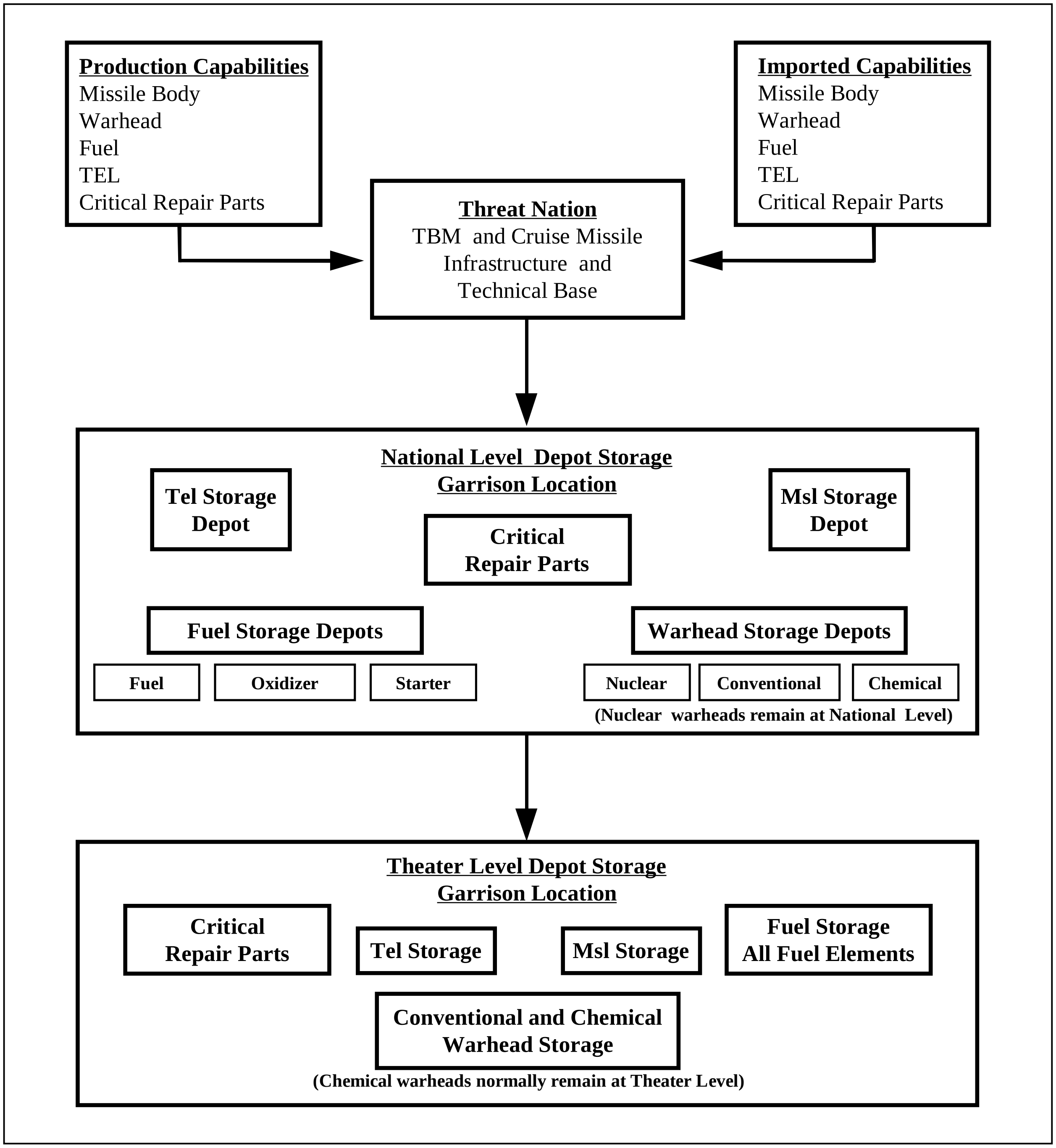


Figure II-4. National Theater Level TM Material Feeder System

(2) Future cruise missile technology will build on existing low observable, sensor defeating designs using radar absorbing materials and composite materials such as Kevlar or carbon fiber to further reduce their radar cross sections (RCS) and render them more difficult to detect. Cruise missile are characterized as having the following features:

- RCS of .1 square meter or less (-10 decibel [db] and lower)

- Low IR signature (varies by type of cruise missile)

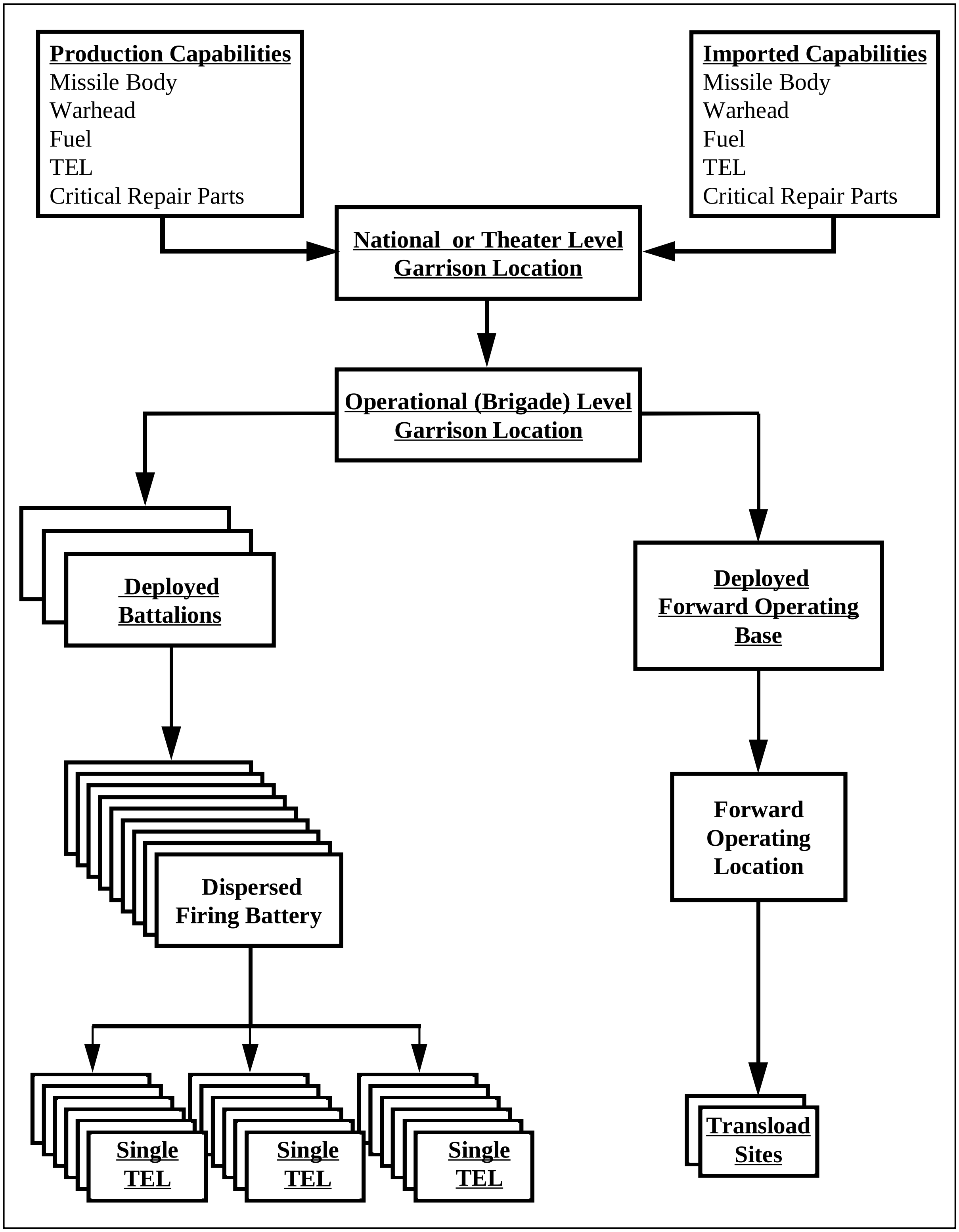


Figure II-5. Typical Deployed TM Organization

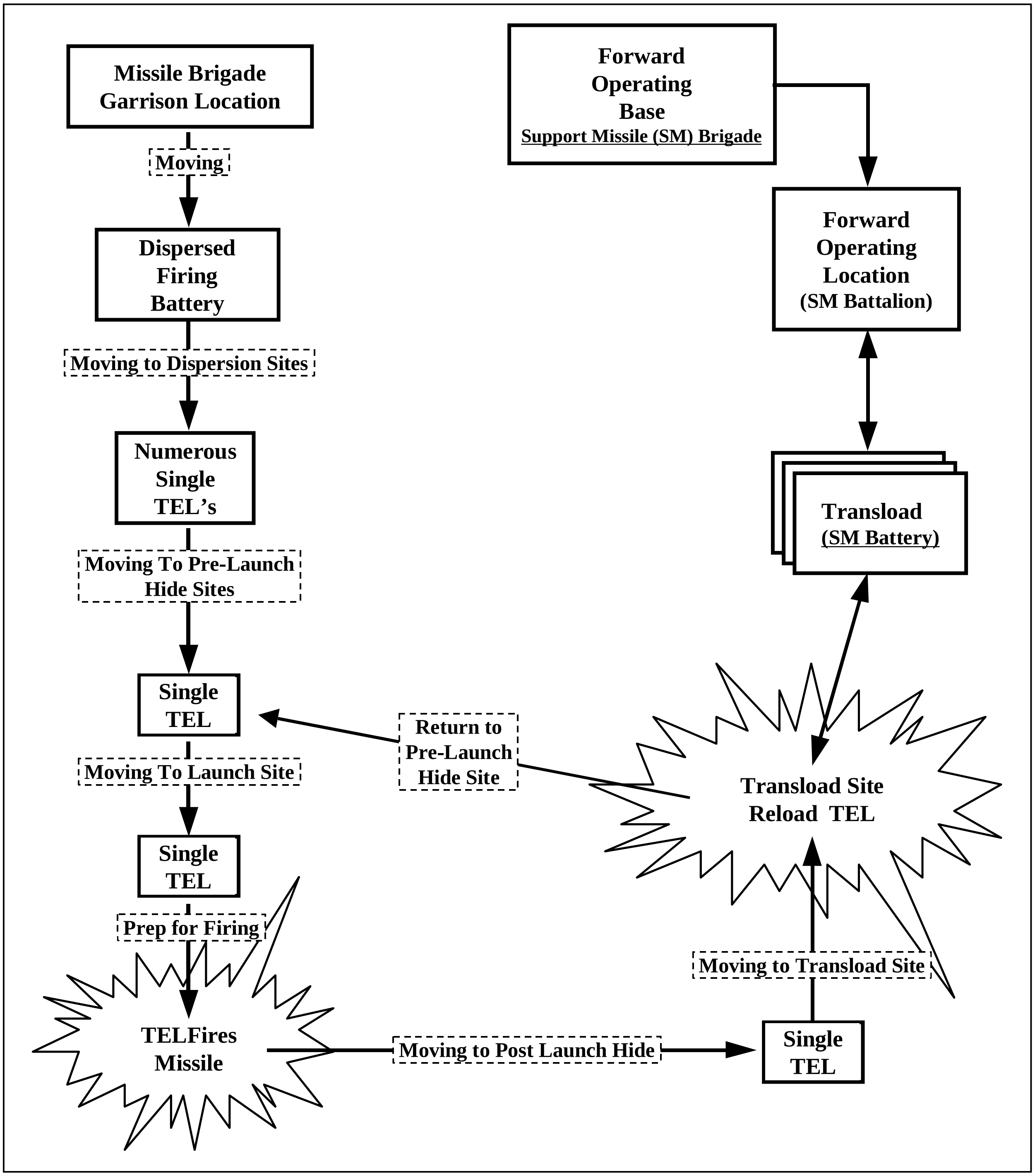


Figure II-6. Launch/Support System Interface

- Acoustic signature (varies by type of cruise missile)
- Cruise altitude of 100' to 2000' above ground level (AGL) or 50,000' above mean sea level (MSL)
- Range of 100 to 1000 nautical miles (NM)

- Payload of 200 to 1000 pounds (lbs).

- Speed range of high subsonic (low altitude) or supersonic (high altitude)

- Air, land, or sea launched

c. Threat Cruise Missile Employment.

(1) Cruise missiles stress air defense systems because they are difficult for theater sensors and weapons systems to detect, identify, track, acquire, and destroy. Cruise missiles are normally more difficult to detect than the larger TBM because they do not give off as large a heat signature at launch and normally have a smaller RCS. Ground based surveillance radars may have a difficult time detecting cruise missiles when in low level flight (following terrain contours) because of line-of-sight restrictions created by terrain masking. Similarly, airborne radar systems may have a difficult time isolating cruise missiles from ambient noise caused by ground clutter. These traits, when combined with radar evasion techniques and low observable (LO) construction methods, cause delays in detection and engagement decisions by battle managers. However, once cruise missiles are detected in flight, they can be engaged by fighters, air defense artillery (ADA), and surface-to-air missiles (SAMs).

(2) The expected flight profile for a cruise missile is low altitude, medium-to-high speed. Although a low altitude cruise missile flight profile presents a higher RCS view to airborne radar, it also requires the airborne radar to search through ground clutter. Ground radars may be able to detect the release of an air-launched cruise missile (ALCM), but will have increased difficulty in tracking the cruise missile at low altitudes.

(3) Sea-launched (SLCM) and ground-launched (GLCM) cruise missiles present opportunities for detection as well as challenges for surveillance systems. Surface launch systems must normally be boosted to “cruise” altitude. The boosted phase often uses a rocket motor that will produce an infrared signature that could potentially be exploited by space-based or properly positioned theater assets. ALCMs do not have a boost plume since aircraft or UAV deliver them above the cruise altitude. Although the cruise missile has a small RCS, it is vulnerable to radar detection during descent to its low-level altitude. Once near the surface and in a terrain following mode, sensors have to filter radar ground clutter to extract a radar signature from these low altitude profile missiles.

(4) High altitude, high mach profiles rely on altitude and speed to overcome defenses. Because the cruise missile is high, ground-based radars will not be obstructed by the curvature of the earth and airborne radars can discriminate them from ground clutter. As a result, when using the high altitude profile, cruise missiles are more likely to be detected earlier in flight than when using a low-level profile.

(5) Cruise missiles provide a significant standoff range for the aircraft or launch platform and remove the “manned” component of the weapons system from the immediate target area. The release range of cruise missiles from aircraft and other platforms can easily be beyond a defender’s radar and sensor range. The long distance release or launch of cruise missiles and their smaller radar signature increase the possibility that surveillance assets will not detect missiles. Battle managers require automated cues to

narrow their focus in detecting cruise missiles in any surveillance area. Combining hostile aircraft attacks with cruise missile and air-to-surface missile (ASM) attacks may allow "leakers" to get through. Indeed, cruise missiles may resemble and be misidentified as manned aircraft.

(6) Rapid combat identification is *critical* for cruise missile defense. Rapid TBM identification is a less important factor because they can be readily identified hostile based on point of origin and identifiable flight profiles. Cruise missile defense is further complicated by the use of low observable (LO) technology and SOF aircraft without identification-friend or foe (IFF) transponders operating, thus requiring verification as friendly prior to attack. Cruise missiles make surveillance and detection difficult because their flight profiles are specifically designed to defeat or confuse radar tracking. As with ballistic missiles, the objective is to eliminate as many cruise missiles as possible before launch. Cruise missiles in flight are definitely time-sensitive targets (TSTs). The challenge for defending against cruise missiles is to find them early, before launch if possible, and engage them before they can navigate to their targets.

(7) Training patterns or identifiable launch sequence events are rarely observed or practiced in an overt environment. Consequently, the probability of conclusively identifying a ground-launched cruise missile TEL using current sensor data is small. Attacking a cruise missile TEL requires the earliest possible detection of the target and the ability of sensors to discriminate between TELs and other targets. Targeting cruise missiles will therefore depend in great part on pre-hostility IPB efforts. Targeteers will require information on infrastructure, logistic support patterns, movement discipline, and signatures of typical storage and assembly facilities. Identification by signature is key to finding cruise missiles before launch, since detecting the launch itself or tracing the flight path back to the launch site may be extremely difficult when they are launched from maximum range.

a. Cruise Missile Target Development

(1) Procedures for finding and targeting cruise missiles on the ground are no different than for finding other targets using a variety of theater and national sensors. Space based and theater RSTA assets will normally collect intelligence data on these targets prior to armed conflict as part of IPB. Sensors on Joint Surveillance, Target Attack Radar System (JSTARS), unmanned aerial vehicles (UAVs), and SOF pass mobile and stationary cruise missile target information to analysts and battle managers by datalink or voice. Data collected and fused from multiple sensors will provide the necessary confirmation of the target. Characterization of a surface target as a WMD will depend on data from high-resolution sensors such as Enhanced and Inverse Synthetic Aperture Radars (E/ISAR). Immediate threat data will be broadcast over intelligence processing and transmissions systems such as Tactical Related Applications (TRAP) and Tactical Data Dissemination Systems (TDDS).

(2) When conflict begins, sensors must be used to validate known target information. Aircraft and naval launch platforms for ALCM and SLCM provide identifiable signatures against relatively uncluttered backgrounds (sky and sea) and will yield opportunities to detect, track, acquire, and attack these platforms. GLCMs will present a more difficult target set. The following is a discussion of targeting methods against each category:

(a) ALCM. Destroying ALCM capable aircraft on the ground or neutralizing their supporting airstrips/bases is the best means to prevent ALCM employment. In this context, missions against this target system do not differ from other offensive counterair (OCA) missions in terms of tactics or weapons. The IPB process must focus on providing the intelligence targeteers need to determine which aircraft and air bases support ALCM activity and task missions against them accordingly.

(b) SLCM. Destroying the launch platform in port is the best means to prevent SLCM launch. The IPB process will provide the naval order of battle (OB) information to identify specific SLCM carriers and support bases for targeteers and battle managers to task missions against them. Signatures of naval vessels and their substantial support base infrastructure will facilitate finding SLCM targets by satellite, UAV, and other surveillance platforms.

(c) GLCM. GLCM platforms are normally an adaptation of any available vehicle chassis capable of supporting one to two tons. Any medium to large size truck or tracked vehicle could be developed into a cruise missile TEL. These TELs will likely be considerably smaller and less distinct than heavier TBM TELs; however, a robust IPB effort can catalog such known and suspected vehicles for exploitation by surveillance sensors. GLCM deployment and training in suspect nations must be collected against and studied for behavioral cues to detection. Long range GLCM permit the enemy to establish a large number of well-dispersed, fixed launch locations (both actual and decoy) deep within their own territory. The enemy can be expected to employ camouflage, concealment, and deception (CCD) against fixed and mobile TELs to reduce probability of detection. Targeting mobile GLCM platforms or newly discovered fixed sites as TSTs will depend on a robust IPB; dynamic management of intelligence, surveillance, and reconnaissance assets; dedicated and trained analysts aided by technology improvements such as automatic target recognition (ATR) systems; and a responsive command, control, communications, computers, and intelligence (C4I) architecture.

5. ASMs

ASM employment can be expected on all battlefields. Like TBMs and cruise missiles, ASMs are capable of delivering a complete range of warheads and can be carried by a variety of rotary and fixed-wing platforms. Flight profiles, short flight times, and reduced RCS make these missiles difficult to track, acquire, and target. ASMs increase the survivability of the delivery platform through standoff capability beyond the range of point defenses. Most of the North Atlantic Treaty Organization (NATO) and former Warsaw Pact nations are equipped with US and Russian manufactured systems respectively and have exported these systems throughout the world. The best method for countering ASMs is to target the delivery platforms and related bases and facilities.

6. Conclusion

While each TM system is unique, each category (TBM, Cruise Missile, and ASMs) exhibits similar characteristics and functional operations. This chapter discusses the essential framework for each in a generic fashion and serves as a foundation for an initial understanding of how TMs operate. Specific analysis is required to apply this information

to a particular missile system and country. The vignette at the end of this chapter is included as a reminder that facts must be proven, not simply accepted.

<u>The Lure of the Expected</u>

Deception is a key part of any combat operations. The examples below illustrate what happens when analysts stop analyzing events and begin to believe what they think they are seeing.

World War II

Prior to the beginning of the V-1 attacks against London on June 12, 1944, the Allied attack operations concentrated on an elaborate system of “sites” which were believed to be Nazi V-1 launch locations. The locations were dubbed “ski sites” because of the shape of several long, curved buildings that were characteristic in the aerial photographs of each location. These sites were targeted and heavily bombed from December 1943 through May 1944. Although the “ski sites” were largely destroyed, not one of the real V-1 sites was attacked during this period. Once Hitler unleashed his missile force on England in June, the volume of V-1 launches provided incontrovertible evidence that a second set of launch sites was actually being used. Not until then did the weight of the Allied bombing effort finally begin to shift to the correct targets. Even so, the real sites were so hard to find due to Nazi camouflage and concealment measures that attacks were still being made on nearby decoy “ski sites” until the end of June.

- Based on Operation CROSSBOW Volume of the US Strategic Bombing Survey

Gulf War

The initial hope of the planners in Riyadh that heavy attacks on the fixed Scud sites during the opening hours of the air campaign would largely eliminate Iraq’s capability to launch ballistic missiles against Israel or regional members of the U.S.-led Coalition proved to be illusory. On the night of 16-17 January 1991, the fixed Scud launchers in western Iraq functioned as “decoys” that diverted attention away from the mobile launchers that had already deployed to their wartime “hide” sites, and the first of Iraq’s extended-range Scuds were fired at Israel the following night.

Once Scuds started falling, first on Israel and then on Saudi Arabia two days later, the next best military option would have been to locate and attack mobile launchers before they had time to fire. Soviet exercise patterns in central Europe with Scud-B’s and Iraqi practice during the Iran-Iraq War, indicated that if the Iraqis followed prior practices, there might be enough pre-launch signatures and time to give patrolling aircraft some chance of attacking mobile launchers before they fired. However, the Iraqis dramatically cut their pre-launch set-up times, avoided any pre-launch electromagnetic emissions that might give away their locations before launch, and seeded the launch areas with decoys (some of which were very high in fidelity). ….most (and possibly all) of the roughly 100 mobile launchers reported destroyed by Coalition aircraft and special operation forces now appear to have been either decoys, other vehicles such as tanker trucks, or other objects unfortunate enough to provide “Scud-like” signatures.

- Gulf War Air Power Survey, 1993

Chapter III

STRATEGIES AND PROCEDURES

> "It seemed likely that, if the German had succeeded in perfecting and using these new weapons [V1/V2} six months earlier than he [Hitler] did, our invasion of Europe would have proved exceedingly difficult, perhaps impossible. I feel sure that if he had succeeded in using these weapons over a six-month period, and particularly if he had made the Portsmouth-Southampton area one of his principal targets, Overlord might have been written off".
>
> -- Dwight D. Eisenhower, Crusade in Europe

1. Theater Missile Strategy Development

a. TM strategy development requires a joint effort between operations and intelligence personnel at the JTF and component levels and must be an integral part of the JFC's overall campaign strategy (Figure III -1). Planners develop a TM strategy based on the JFC's objectives and guidance and known intelligence. In turn, the approved strategy drives IPB, collection management, and target development.

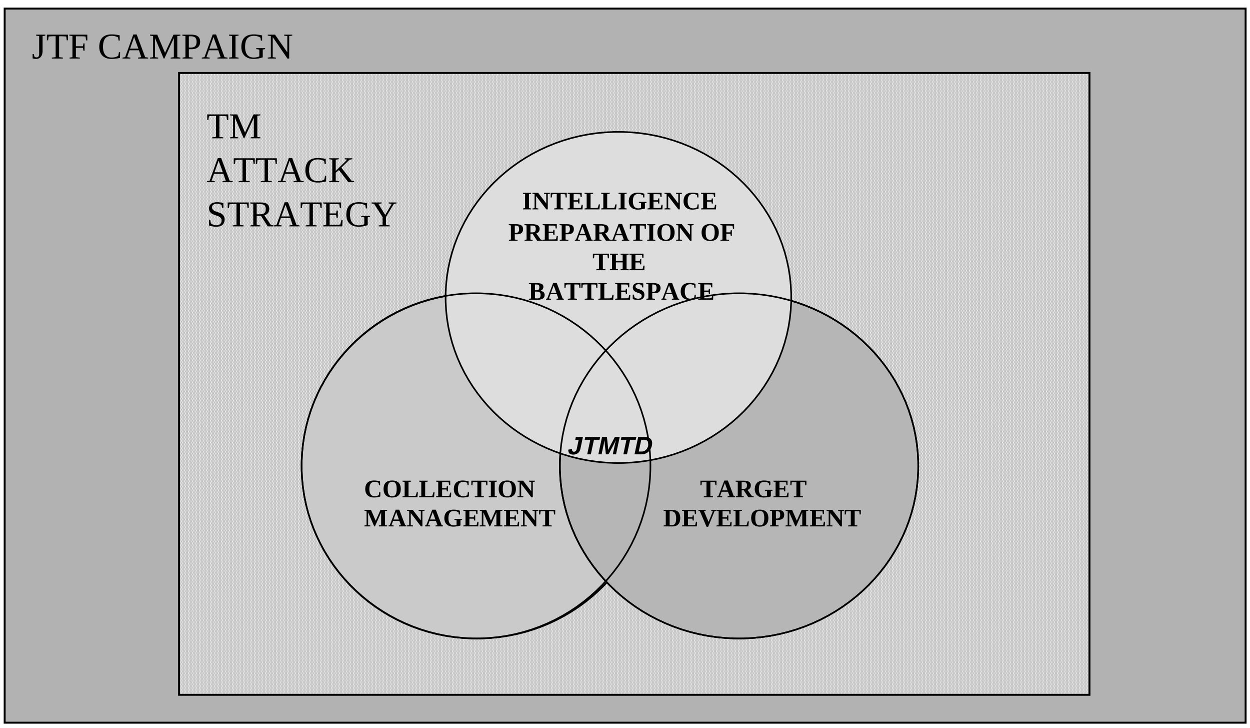


Figure III-1. Joint Theater Missile Target Development Construct

b. **A TM attack strategy should do the following:**

(1) Plan for continuous engagement of the entire TM target system.

(2) Orient on the TM vulnerabilities and decisive points.

(3) Be supported by predictive and developed intelligence.

(4) Be synchronized with the overall phases of the campaign.

(5) Maximize use of all available resources.

(6) Be continuously assessed and adjusted.

c. Continuous engagement of TMs is necessary to deprive the adversary of the initiative. Attacking the entire target system simultaneously prevents enemy TM forces from conducting unimpeded operations and forces them to change their operating patterns to regain the initiative. This potentially creates further opportunities for exploitation by exposing TM vulnerabilities.

d. Doctrinal templates and enemy courses of action (COA) developed during initial IPB serve as the basis for identifying TM vulnerabilities and exploitable decisive points. A decisive point is a point, usually geographical in nature, that, when retained, provides the commander with an advantage over his opponent. Decisive points may also be physical elements such as critical equipment, command posts, communications nodes, etc. Determining TM vulnerabilities and decisive points requires a thorough understanding of the adversary's operational capabilities, concept of operations (CONOPS), and intentions. Once identified, these elements or specific aspects of the target system may become high payoff targets (HPTs) for nomination and attack when acquired.

e. The TM attack strategy is fully dependent on predictive and developed intelligence derived from the IPB process. Predictive intelligence implies that the friendly level of understanding of the enemy's plan is sufficient to predict what likely will occur next. In the case of TMs, this means developing a near-real time picture of TM activity and detailed analysis of potential TM operating areas. Because TM information is highly perishable, the collection strategy and sensor distribution plan must be tailored to support these requirements.

f. The TM strategy also defines the phasing, timing, and desired effects of attacks. For example, the initial phase may focus on immediately reducing TM launches, while later phases may focus on destroying the enemy's ability to reconstitute TMs in the future. The strategy must also define what "success" means for each phase based on combat assessment results (for example, TM launches reduced 70% by D+7). An example of theater level guidance regarding TMs might be written as follows:

> *Establish an intelligence collection plan, to include locating and targeting enemy missile order-of-battle (i.e., WMD storage sites, manufacture and assembly facilities), forward operating bases, and LOC supporting the missile order of battle. Reduce the enemy's ability to reconstitute, store, and transport TMs with WMD. Complete destruction of missile manufacture/assembly facilities, known storage facilities, and FOBs. Degrade by 50% the LOC between storage facilities and FOBs.*

Table III-1 Example Task to Subtask Translation	
Task 1	Disrupt enemy TM launch operations.
Task 1A:	Destroy FOBs and ground support equipment necessary to conduct launch operations.
Task 1B:	Countermobility: interdict key LOC between FOBs, transload sites, and firing locations.
Task 1C:	Destroy/disrupt enemy TM C2 capabilities: force enemy to use more exploitable communications.
Task 2	Destroy enemy long-term TM capability.
Task 2A:	Destroy key TM production/test facilities.
Task 2B:	Destroy TM garrison and depot facilities.
Task 3	Destroy TELs at firing locations and hide sites.

g. Once a broad attack strategy has been defined, tasks and subtasks can be written to amplify specifics and aid strategy implementation. Table III-1 illustrates possible attack strategy tasks and subtasks.

h. As stated in Chapter 2, TM threats cut across many operational/component lines. This makes countering TMs a joint task**. All collection and attack assets must be employed in a manner that maximizes the strategies. Fixating on one particular platform over another is counterproductive.** Each available asset must be considered on the merit of how it best contributes to the strategy given the circumstances. The attack strategy should also define how time-sensitive TM targets will be prosecuted or tracked for intelligence and should discuss optimal use of assets.

i. Finally, just as the overall campaign is assessed and adjusted based on the situation, so must the TM strategies. Based on feedback from combat assessment of friendly operations, weapon system availability, and the enemy's response current operations and intelligence personnel reassess collection and attack strategies. These assessments help determine when a particular phase has been completed, whether the next phase should be implemented, and how to adjust plans to better meet the JFC's overall objectives regarding TMs. Keeping continuous pressure on the entire TM target system during transition between and throughout each phase of the operation is essential.

j. Who conducts JTMTD and how it is integrated between echelons is the subject of Chapter IV. In the end, however, it is less important where these functions occur than that they are done in a dedicated, cohesive, and timely manner to achieve the desired end state. Figure III-2 depicts the activities and steps involved in conducting attack operations. This publication's principal focus is on implementation of sensor activities necessary to achieve TM target nominations.

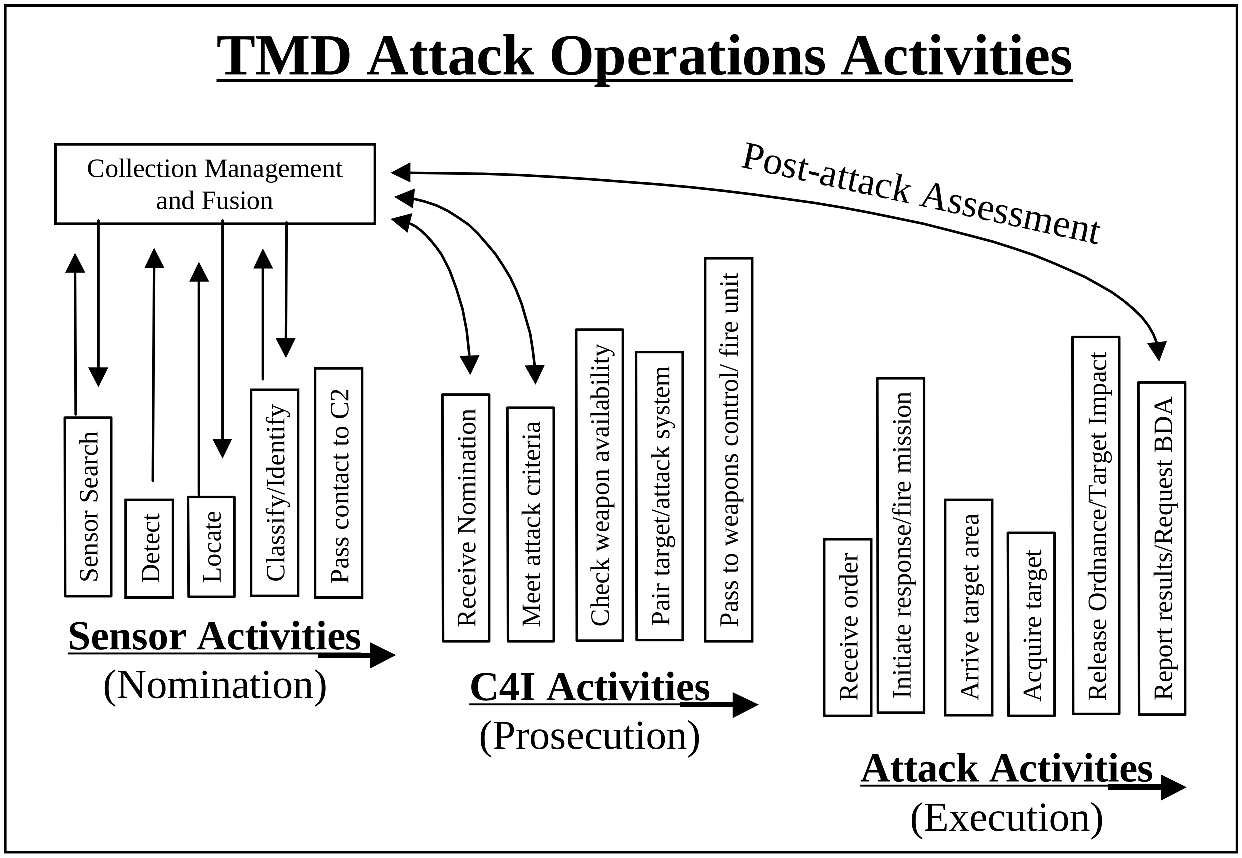


Figure III-2. TMD Attack Operations Activities

2. JTMTD Process

a. There are multiple paths to countering TMs; some defensive, others offensive. Offensive measures to prevent launch are significantly complicated by the target system's mobility, dispersed operating patterns, and elusive tactics. Achieving pre-emptive success against TMs requires a melding of three processes: IPB, collection management, and target development (refer back to Figure III-1). While each process is distinct, they cannot achieve their collective purpose if they are not properly harmonized.

b. Effective theater missile defense (TMD) requires a cohesive collection plan, capable of providing timely intelligence information into a well established IPB process. The enemy TM picture provided by IPB requires constant monitoring and must be updated in near-real time. Equally important is the need for streamlined target nomination procedures. IPB, CM, and target development processes are a routine part of operations at all echelons of command. "Harmonizing" these processes requires implementing TTPs that provide quality TM target nominations through established staffing mechanisms (for example, the JTCB). Achieving this "harmony" is a challenge – and the focus of this chapter.

c. JTMTD is the synergistic outcome of allocating, integrating, and synchronizing resources in order to identify and nominate selected targets in the TM target system for timely attack. It is how we accomplish the following:

(1) Apply the IPB process in a logical manner to TMs.

(2) Establish a common perspective of the enemy TM intelligence picture among all analysts, planners, and execution forces.

(3) Use this common understanding and the JFC's objectives and guidance to devise a joint attack strategy against the entire TM target system to disrupt, neutralize, or destroy the threat missileer's operating tempo (OPTEMPO – the ability to conduct and sustain launch operations).

(4) Submit TM intelligence requirements into the CM process for application of national and theater assets.

(5) Employ joint C4I systems to monitor, detect, and report TM activities, and responsively cue intelligence, surveillance, and reconnaissance assets to confirm TM activity.

(6) Collaboratively integrate perishable combat and all-source intelligence information to refine the TM picture and confirm which COA the adversary has chosen.

(7) Capitalize on situational awareness (SA) to rapidly develop target nominations.

(8) After force execution, integrate post-strike combat assessment (CA) to adjust the attack strategy.

"A good IPB is essential if the operators are to understand how the threat is likely to operate, to get the sensors in the most effective configuration and to react to subtle TM activity indicators. The IPB information helps sort out real TM information from the distracting background traffic".

- Joint Theater Missile Defense – Attack Operations Joint Test Force, 1997

3. TM Intelligence Preparation of the Battlespace (TM IPB)

a. Joint intelligence preparation of the battlespace (JIPB) is the analytical process used to produce intelligence assessments, estimates, and other intelligence support products that enable the JFC and the joint staff to visualize the full spectrum of adversary capabilities and COA across all dimensions of the battlespace. JIPB for TMs is the integration of national, theater and component intelligence operations to develop a single TM intelligence picture. The guiding principles for conducting JIPB are delineated in Joint Publication 2-01.3, *Joint Intelligence Preparation of the Battlespace (Draft)*, and US Army field manual (FM) 34-130, *Intelligence Preparation of the Battlefield*. The Defense Intelligence Agency (DIA) National Air Intelligence Center (NAIC)-061-0789-97 (S), *Theater Missile Defense Intelligence Preparation of the Battlespace Methodology* (S), provides in-depth information on conducting TM-specific IPB.

b. JIPB is the process of building an extensive database for each potential JOA and then analyzing it in detail to determine the impact of the enemy, environment, and terrain on friendly operations. JIPB is a continuous and iterative process (Figure III-3) with input from many levels and is usually presented in graphic form. Components conduct IPB to meet their respective needs, which contributes to the overall JIPB process for the joint force.

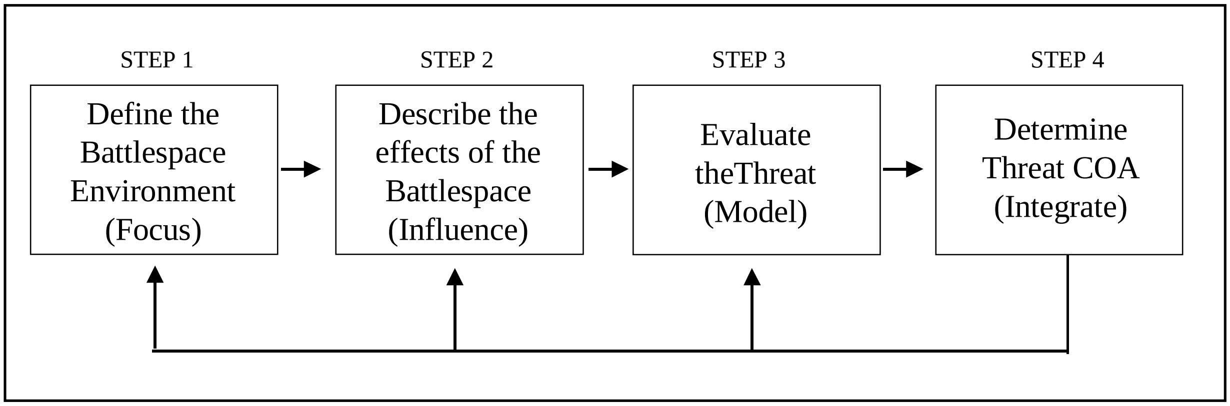


Figure III-3. JIPB Iterative Steps

c. TM IPB is the continuous application of the JIPB methodology against each specific missile threat in a specific geographical area. A well-developed TM IPB provides the intelligence necessary to determine likely TM COA and associated COA branches and sequels and describes the environment in which friendly operations and planning must occur. TM IPB supports offensive, defensive, and passive counter missile efforts. TM IPB differs from other air-, land-, or sea-focused IPB. For example, while a ground IPB concentrates on maneuver forces in defensive positions or moving forward, TM IPB focuses on dispersed ground activities in the enemy's rear area most likely moving away from the front. Likewise, an air-focused IPB would center on intelligence required to achieve air superiority, conduct air interdiction and strategic attack vice the more narrow focus TM threat. From an analytical perspective**, TM IPB breaks down and correlates the who (units), what (equipment), when (timing), where (infrastructure), why (objectives), and how (operations) of an enemy TM force to derive likely enemy COA.**

d. Developing a TM IPB requires dedicated analysts who have developed a keen understanding of the enemy's TM forces through repetitive analysis – it is a full-time function. While all missile systems have similar characteristics, each country's TM force will differ depending on how it is equipped, organized, trained, and employed. Appendix C provides a list of questions that can help analysts start the TM IPB process.

e. As depicted in Figure III-3, IPB is a continuous and iterative process, with each step looping back to previous steps to keep the IPB valid and complete. IPB provides intelligence and operational decision-makers direction in adjusting collection efforts and conducting operations. For TM IPB efforts to be effective, all commanders and supporting staffs must understand and apply the methodology in the same manner. The following sections provide the basis for a common approach.

f. TM IPB Process.

(1) Define the Battlespace Environment – Step 1 (Figure III-4)

(a) The objective of Step 1 is **to focus** the IPB effort on the areas and characteristics of the battlespace that will influence the joint force's response to TM threats. This step focuses initial intelligence collection efforts and provides the foundation for the

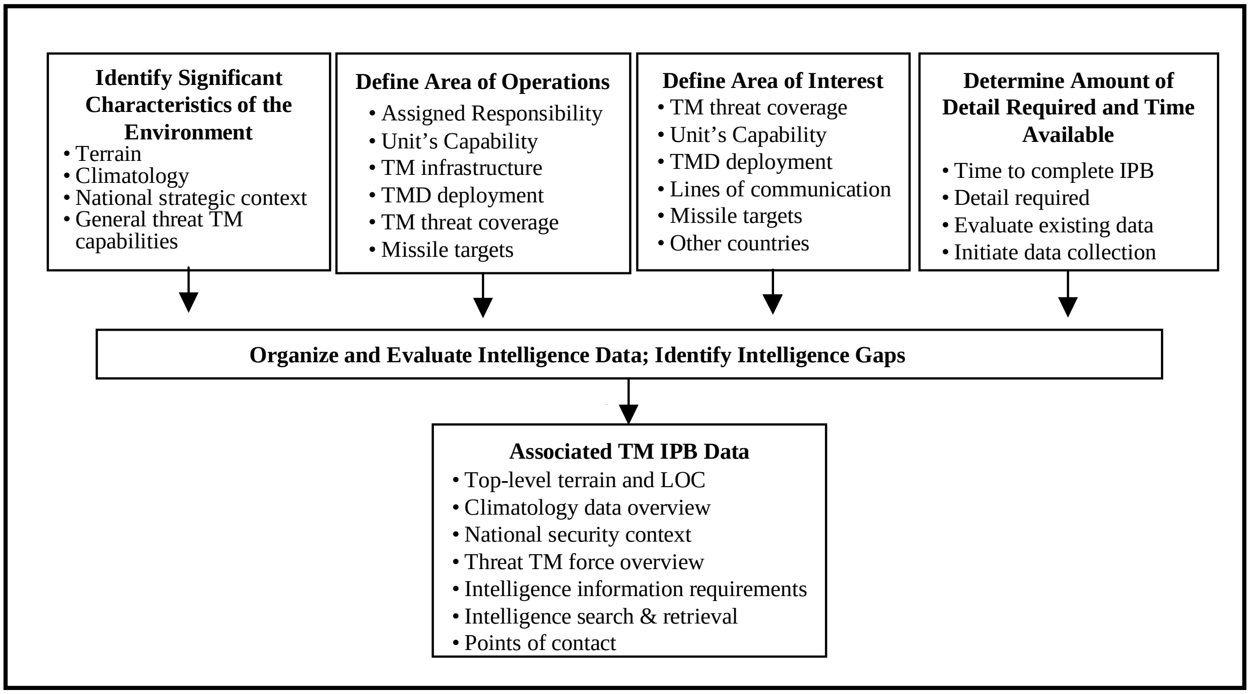


Figure III-4. Define the Battlespace Environment

remaining IPB steps; it identifies the dimensions of the battlespace and the significant characteristics that require in-depth evaluation. Most importantly, this step evaluates the amount of time available to conduct the IPB and the completeness of existing database information and identifies intelligence gaps.

(b) Identifying significant characteristics includes developing a broad understanding of the region's terrain and climatology and the enemy's national strategic context (geopolitical environment) and a basic understanding of the threat's TM capability. This understanding is the basis for defining TM AO and area of interest (AI) – see glossary for definitions. Given the range of weapons systems and the size of potential adversary countries, the typical AO and AI is usually quite large. Accessing the amount of time available to achieve the desired level of intelligence "readiness" is very important. Overcoming time limitations requires prioritizing efforts and maximizing analytical and collection resources. This means that the AO and AI must be "scoped down" to the areas that require detailed analysis and "ordered" according to priority of work.

(c) One technique for "scoping down" is to examine the friendly defended asset list (DAL) in conjunction with the adversary's national strategic context. In doing so, analysts can develop an initial list of most likely friendly targets for enemy missiles. Using this list of likely friendly targets at risk and the maximum range of the enemy's TM weapons systems, analysts can then "reverse engineer" the most likely TM operating areas. As stated in Chapter II, the enemy missile force is likely to be as deep into his AO on Day 1 of a conflict as they will go. Therefore, initial area delimitation can be accomplished by drawing weapons systems maximum range arcs on a map from the likely targets (friendly key assets) back into the adversary's operating area. This "arced in" area can be further refined by eliminating areas that do not have sufficient infrastructure (road networks, rail lines, cover and concealment, etc.) to support missile force operations based on knowledge of

the adversary's TM TTPs. What remains are the likely TM forward operating areas that require detailed analysis (Figure III-5).

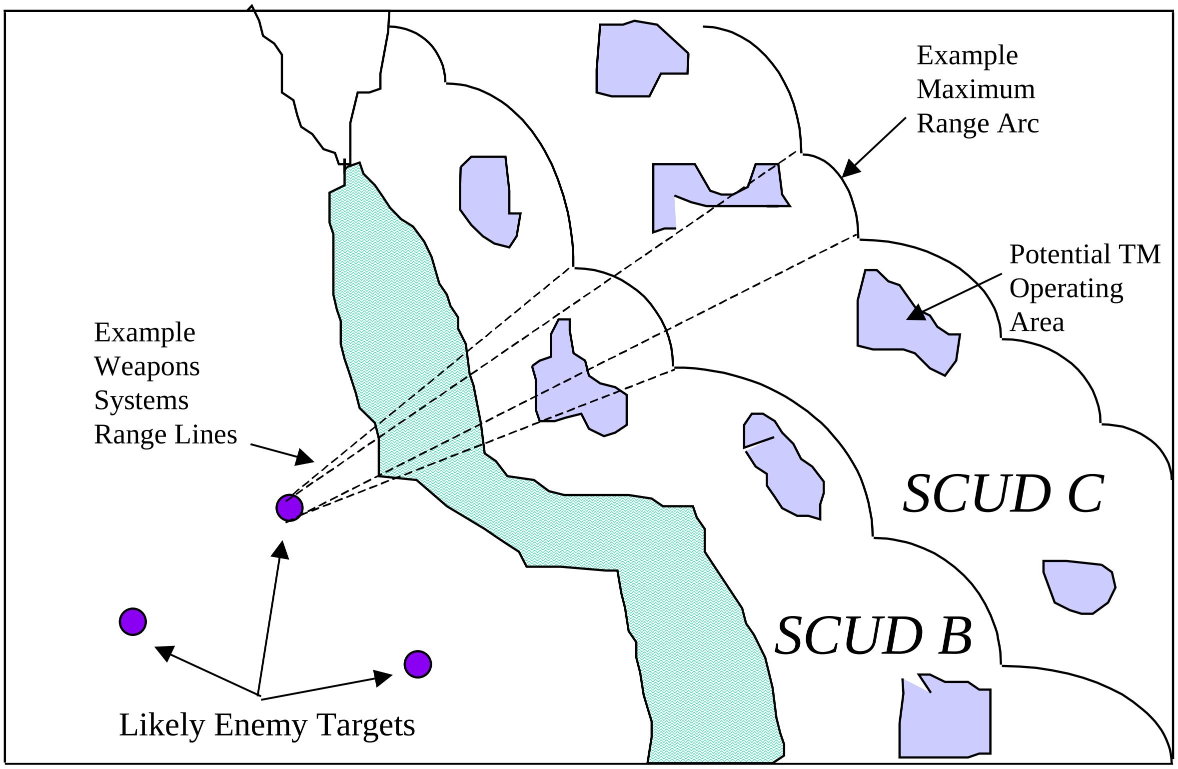


Figure III-5. Initial Area Delimitation Technique

(d) During subsequent IPB steps, these likely operating areas, TM infrastructure (such as lines of communications, storage sites, ports of entry, etc.) and the TM systems themselves are analyzed in detail to provide an initial TM intelligence picture. Because IPB is an iterative process, this initial TM picture is continually refined as new information becomes available through collection efforts. Likewise, collection efforts are adjusted to cover new intelligence gaps resulting from updates to the IPB. Figure III-6 provides critical requirements and key threads for Step 1.

(2) Describe the Battlespace's Effects – Step 2 (Figure III-7)

(a) This step determines how the battlespace environment affects enemy TM and friendly operations. The assessment of the environment includes an examination of terrain, weather, and other characteristics of the battlespace. It identifies the influences (limitations and opportunities) the environment provides for friendly and enemy operations. For TM IPB, this step focuses on area limitation assessments of probable missile operating areas and a detailed analysis of the supporting strategic infrastructure.

(b) It is important to remember **that the most important operating characteristic of ballistic and cruise missile target systems is their mobility.** To achieve and sustain launch operations requires a great deal of movement from all of the target system components (launch platforms, GSE, transshipment from strategic storage, etc.). Detecting and tracking the movement of various target system components is the key

Critical Requirements for Step 1

A thorough understanding of theater and national intelligence architectures.

Knowing where to locate data already available in the intelligence community.

Key Threads to Other JTMTD Process

IPB - Focuses and prioritize subsequent IPB step.

CM - Provides initial collection requirements.

TD - Provides initial adversary operation data to support parallel planning.

Figure III-6. Key Points Step 1

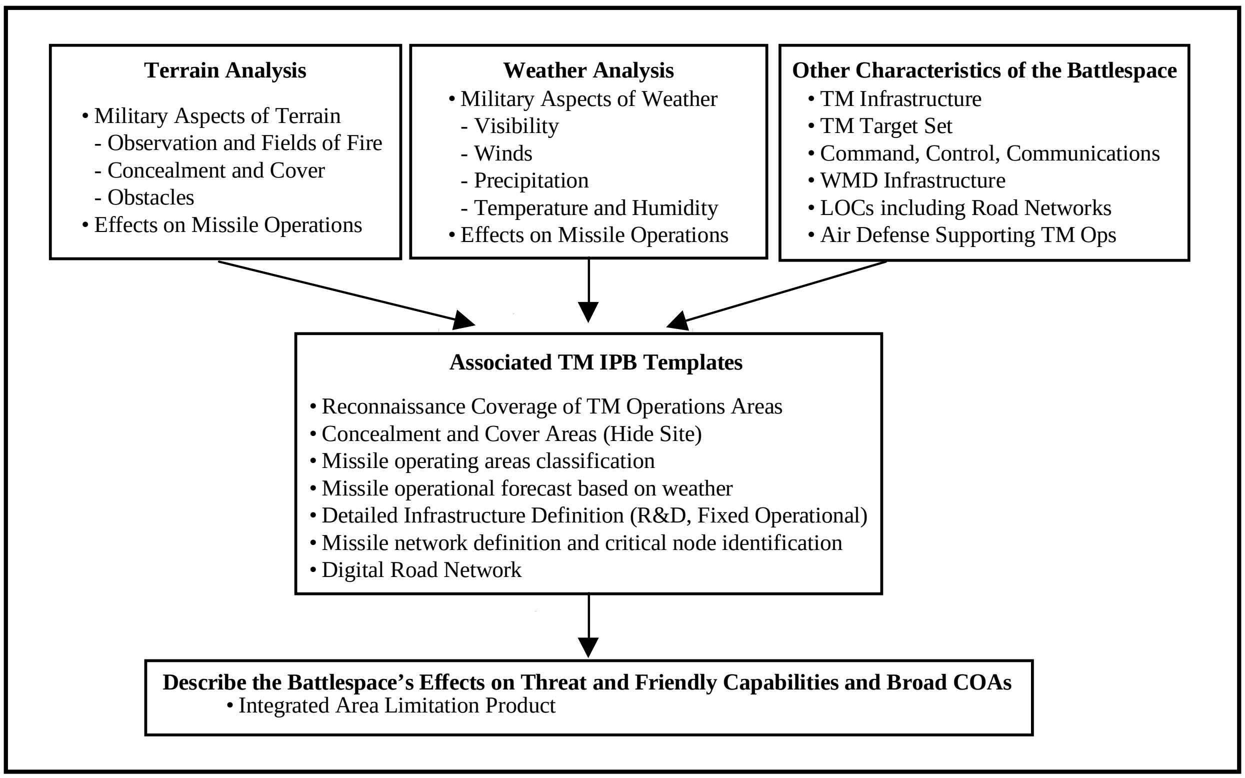


Figure III-7. Describe the Battlespace's Effects

to determining actual enemy COA and disrupting the enemy's plans. Therefore, area delimitation and mobility analysis are two critical parts of the TM IPB process.

(c) Analysis of the battlespace's effects (especially mobility analysis), when combined with Step 3's "evaluation of the adversary" and Step 4's "determine adversary COA," drives initial sensor employment recommendations and the overall TM collection effort. To achieve the level of analysis required, it is essential to have current terrain data and adequate terrain data postings. Without this information, analytical results will be questionable. For example, if new road networks are missing from the database, an ideal

TM operating area can be overlooked. Likewise, if the data postings are only to 100-meters, then trying to determine where a 5-meter long TEL can move, hide, or launch from is impossible. Because demand for sensor systems can quickly outstrip availability, getting them in the right place the first time is extremely important. This is especially true of special operations forces (SOF). If the terrain database is inadequate, the likelihood of wasting collection resources increases substantially.

(d) Products produced during step 2 (such as terrain masking data, mobility analysis, slope information) are not end products themselves; rather they are tools for analysts to determine their effect on threat COA and which friendly COA are feasible. There are a variety of automated terrain analysis tools available to assist in area delimitation efforts. When combined with supplemental reconnaissance, analysis of high resolution maps and imagery, and knowledge of the enemy's TM TTPs, it is indeed possible to determine the most likely launch sites, hide sites, transloading areas, FOLs, FOBs, and forward storage areas.

(e) While analysis of potential TM operating areas is critical, analysis of the TM infrastructure is equally important. Missile units must move through the various phases described in Chapter II and cannot sustain operations without support from the TM infrastructure. Analyzing deployment routes, ports of entry, weapons and warhead storage sites, supply routes, etc., is important for target development purposes, and, more importantly, to identify which areas must be monitored as hostilities increase. Tracking the deployment of TM forces is ideal, but, in reality, this is a difficult task. Nevertheless, monitoring TM infrastructure activity may provide key clues to which COA the enemy has chosen.

(f) When conducting TM IPB against cruise missiles and airborne TM launch platforms, air avenues of approach (AA) must also be analyzed. Likely AAs are those that protect missiles or airborne launch platforms from detection and engagement (masking terrain) while still allowing maneuver and providing adequate line-of-sight (LOS) to the target. Other factors that will affect cruise missile AA include attack profile, ordnance, point of origin, and ground control radar positions.   Like cruise missiles, fixed-wing aircraft used as TM launch platforms will usually follow major terrain or man-made features and attempt to maximize terrain masking. Ordnance or payload may affect range and altitude of the air platform and thus influence the selection of AA. Adverse weather such as strong winds, extreme cold, icing conditions, and poor visibility may also affect the enemy's ability to employ both types of air breathing systems.

(g) Performing IPB correctly in peacetime significantly increases the likelihood that, as hostilities approach, initial collection efforts will occur at the right place and at the right time. This will increase the accuracy of the TM intelligence picture available to the JFC. Without such detailed preparations, TM attack operations will likely default to reactive post-launch strikes against TELs instead of achieving a broad attack strategy against the entire TM target system and ultimately the missile force's OPTEMPO and ability to launch.

(h) Figure III-8 provides critical requirements and key threads for Step 2.

(3) Evaluate the Adversary – Step 3 (Figure III-9)

Critical Requirements for Step 2

Terrain data with postings appropriate for TEL (below 100-meters).

Terrain feature data must be complete and less than 1 year old.

Detailed imagery of potential TM operating areas.

Key Threads to Other JTMTD Process

IPB - Terrain and mobility analysis form basis of SIT template.

CM - Terrain and weather data support sensor employment decisions.

TD - Identifies potential HVTs, HPTs, and countermobility targets for further analysis.

Figure III–8. Key Points Step 2

(a) This step examines in detail (model) the TM force's capabilities and its normal doctrinal organization for combat and TTPs. Understanding how the enemy TM force organizes, trains, and prepares for war during peacetime training is the best indicator of how it will react in combat. **During this step models (known as doctrinal templates) are prepared to depict how TM forces prefer to conduct operations under ideal conditions**. These models include graphical depictions/symbols and simple text descriptions of threat tactics and employment options. Examples include determining what the timing of movement patterns between elements are, what the relative location of equipment is to other elements, etc.

(b) The accompanying narrative should include known information on how the TM force reacts to certain situations. For example, what options may be employed if an operation fails, what subsequent operations may be planned if operations succeed, and an evaluation of the enemy's strengths, weaknesses, and vulnerabilities.

(c) Templating should also include an evaluation of high value targets (HVTs) and their associated vulnerabilities. HVTs are those assets that the adversary commander requires for the successful completion of the mission. HVTs are identified froman evaluation of the database, the doctrinal and TTP templates, supporting narrative and the use of tactical judgement. The initial list of HVTs is developed by wargaming the operation and considering how the threat will use each type of equipment subset to accomplish specific operational objectives. HVT evaluations consider the relative worth of each TM component and how its potential loss would affect enemy's operations in terms of response. Normally it is during this HVT analysis that the enemy TM force's vulnerabilities and exploitable decisive points are identified.

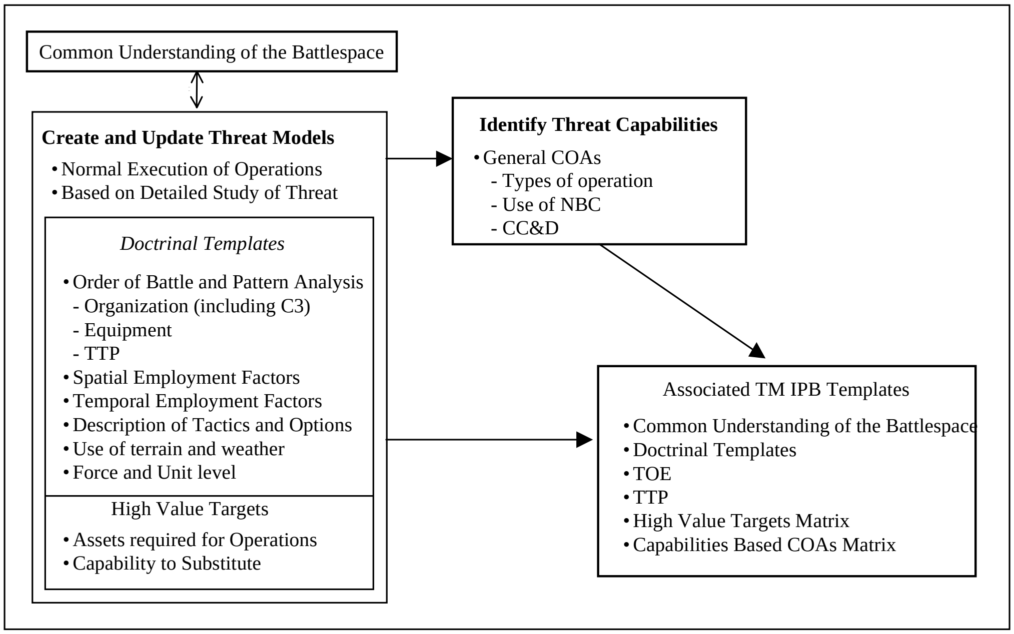


Figure III–9. Evaluate the Adversary

(d) A variety of doctrinal templates at the operational and tactical level are needed to fully evaluate the threat's capability. A systematic method for analyzing threat capabilities starts with a detailed analysis of the enemy's TM order of battle (OB). OB analysis consists of the following factors: TM unit identification and organization (composition), physical location (disposition), weapons, personnel and equipment strength, tactics, training, logistics, combat effectiveness, C4I, and miscellaneous data. The Military Intelligence Integrated Database (MIIDB) should be used to begin the analysis, but a comprehensive evaluation of all available databases; published Defense Intelligence Reference Documents (DIRDs); and direct interface with national intelligence organizations such as DIA, MSIC, NAIC, National Ground Intelligence Center (NGIC), etc., is essential. This information must be continually updated and revised to reflect the latest information available. During actual combat operations, this must also include results of combat assessment.

(e) When evaluating ballistic missiles, a key point to remember is that the target system employs a large number of support vehicles. While analysis of the missile and launch system is important, emphasis must be given to analyzing the function, value, mobility characteristics, etc., of these support vehicles. While the missile launcher will most likely have good to excellent cross-country capability, support vehicles will most likely not. This must be factored into the overall analysis of the TM operating area. Additionally, TM replenishment operations must also be closely scrutinized. Empty launchers are of little value to the enemy commander. Analysts should look for HVTs and vulnerabilities in TM support operations.

(f) It is imperative to remember that templates reflect the ideal. Combat typically dictates modification to doctrinal practice due to conditions such as understrength units, shortage of logistical support, the lack of air superiority, etc. Enemy operations

security (OPSEC) will not be limited to equipment dispersal and random timing of launch cycles, but will also include deception operations to reinforce our perception of the ideal. Analysts must avoid becoming "attached" to the template as the "definitive" instead of using it as a tool to guide analysis of current intelligence information. Figure III-10 provides critical requirements and key threads for Step 3.

(4) Determine Adversary COA – Step 4 (Figure III-11)

(a) This step integrates the results of the previous steps into a meaningful conclusion. That is, given what the threat TM force normally prefers to do, and the specific effects of the battlespace environment in which it is operating, what are the enemy's likely objectives and COA. The desired end state of step 4 is to replicate the set of specific COA the enemy commander is considering (this is predictive analysis). To determine adversary COA, follow the logic depicted in Figure III-11.

(b) Only in rare cases will sufficient intelligence be available to state the threat's objectives and desired end state as facts. **Therefore, when developing estimates it is necessary to ensure that confidence levels are clearly indicated.** Understanding what the enemy is trying to achieve with TM forces is the foundation for COA development. It is important that the full set of COAs available to the adversary be considered, regardless of whether they adhere to doctrine. Unless approached objectively, COA development may overlook sub-optimum or "wildcard" COAs available to the enemy commander. To avoid surprise from an unanticipated COA, analysts must also account for all recent activities and events. Table III-2 contains a partial list of COA development considerations.

(c) While it is important to examine the full set of COAs available to the enemy, it is also necessary to prioritize them and establish a most likely COA. This allows commanders and staffs to maximize resources during planning. Recent activities or events may provide indicators that one COA is already being adopted. Examining all he potential COAs first will also help analysts recognize when the enemy has changed to a new COA.

Critical Requirements for Step 3

Access to all available SCI and collateral intelligence on TMs.

Appreciation of outside influences and their effect on TM forces.

Ready access to CA results affecting TM IPB.

Key Threads to Other JTMTD Process

IPB - Serves as the foundation for threat COA analysis.

CM - Doctrinal templates assist in sensor-to-shooter planning.

TD - OB assist in planning CA. Helps refine DAL, and overall attack strategy.

Figure III-10. Key Points Step 3

TABLE III-2. COA Development Considerations

The threat's intent or desired end state.
Likely attack objectives.
Effects of the battlespace environment on operations from step 2.
Threat vulnerabilities or shortages in equipment or personnel.
Current disposition of TM forces.
Threat perception of friendly force capabilities.
Threat efforts to present an ambiguous situation or achieve surprise.

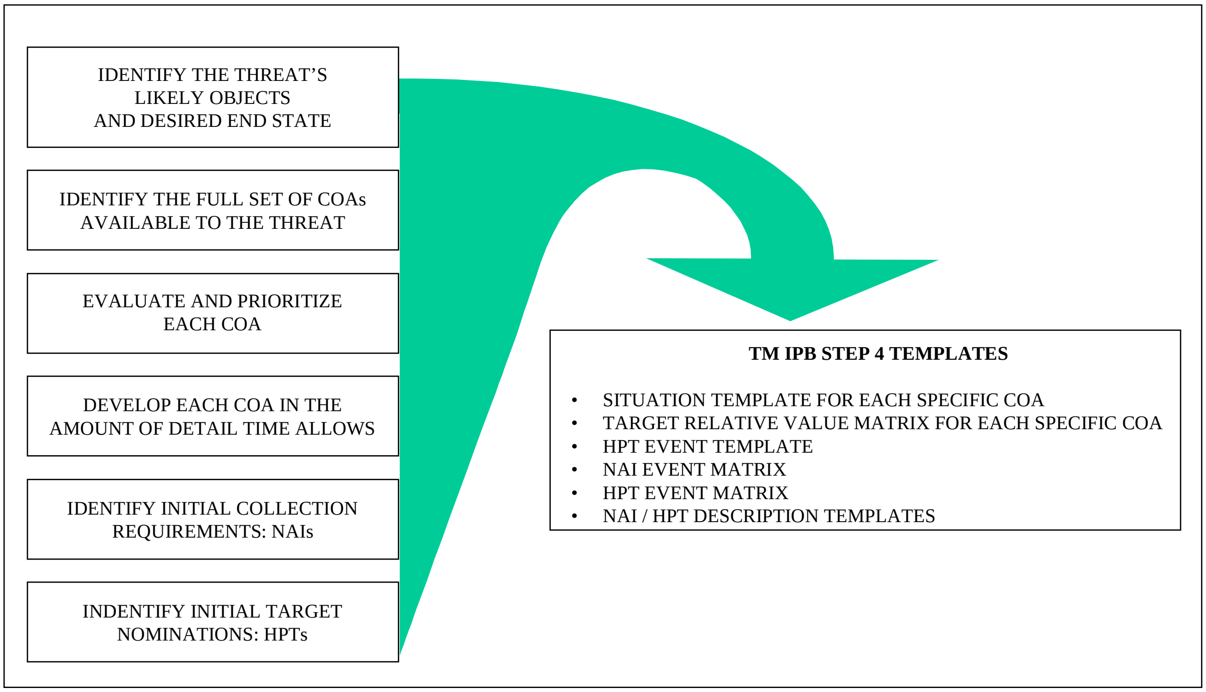


Figure III-11. Determine Adversary COAs

(d) After COA priorities are set, each COA must be developed in detail as time permits. This detail includes creation of situation (SIT) templates, description of potential COA branches and sequels, and a listing of HVTs. Situation templates combine doctrinal templates derived from Step 3 with the area limitation and mobility analysis information produced in Step 2. **SIT templates represent an image of the "ideal" adjusted to the circumstances.** TM analysts create templates to depict the entire TM intelligence picture. At the strategic level, this means focusing on TM forces moving from garrison to field locations, as well as political and economic developments. At the operational level, the focus is on LOC, storage sites, FOBs, and FOLs, while tactical level templates reflect small unit operations to include individual vehicle disposition based on mobility networks and transport times.

(e) SIT templates allow staff planners to wargame enemy COA to determine how and where individual elements provide support to the TM target system and help refine the HVT list developed in step 3. Any area where HVTs must appear or be employed to make the enemy's operation successful should be noted on the situation

template. For example, after missile launch a TEL must undertake transloading operations. This is clearly an operation of high value to the enemy's success; therefore, it is designated a HVT. It may also be designated a HPT. HPTs are–simply defined—enemy targets that, if successfully attacked, will lead to the overall success of the JFC's campaign. Some HVTs, while valuable to the enemy's operation, do not have a direct bearing on the success of the friendly COA and are not designated as HPTs. Using our example, a "TEL transload operation" could be also classified as a HPT because it is of high value to the enemy and meets the friendly COA requirement for preventing TM launches and preserving freedom of action.

(f) Activities that reveal the enemy's selected COA are called "indicators." Where and when these indicators are likely to appear in the battlespace are labeled named areas of interest (NAI). Where and when HPTs are likely to appear are labeled target areas of interest (TAI). Using the term TAI indicates the intent to attack the target when acquired and the requirement to coordinate sensors and shooters for the target area. TAI, NAI, expected indicators, and anticipated timing of HPT exposure (known as time phased lines – TPL) combine to form "event templates." Event templates depict where and when TM actions are expected to occur based on our knowledge of the adversary's CONOPS. Event templates provide the basis for formulating information requirements (IRs) for the collection management process, where collection plans are developed to support monitoring NAI for COA indicators and TAI for potential HPTs. Figure III-12 provides critical requirements and key threads for Step 4.

(g) In summary, the four step IPB process provides analysts and operators a comprehensive methodology for developing an intelligence picture, for TMs or any other target system. IPB is the foundation on which collection strategies and operational plans are built. Crisis does not change the IPB process other than the pace at which it is conducted. The key word in the term IPB is *preparation*. To establish an adequate TM knowledge base requires dedicated resources and personnel and a considerable amount of time. TM IPB requires a major effort by theater and national intelligence centers. Operational forces that will fight in the theater must also be involved so that they will have "first-hand" knowledge of the enemy's TM operating procedures**. If TM IPB database production is not done in considerable detail before hostilities commence, it is unlikely that it can be done well enough once hostilities begin to be effective in a short conflict**. While TM IPB may not provide an abundance of targets on D-Day, it is the key to having the right sensors in the right place at the right time to detect pre-launch TM activity so that we may intercede quickly.

4. Collection Management Strategies

a. **Of all the processes involved in JTMTD, CM is the most critical—it is the linchpin.** TM IPB and target development cannot succeed without the effective employment of sensors. While available sensor systems can readily support the JTMTD process, it can also create a dilemma for the JFC. Finding (and disrupting) TM activity can quickly become a resource-intensive operation. The challenge for the JFC is in balancing the intelligence requirements for countering TMs with the intelligence needs of the overall joint force.

Critical Requirements for Step 4

Access to real time/near-real time sensor data and CA results.

Ability to rapidly correlate sensor data with expected event templates.

Direct input to sensor retasking as situation warrants.

Key Threads to Other JTMTD Process

IPB - Provides analysts "indicators" to watch as operations develop.

CM - TAI/NAI serve as the basis for sensor system employment.

TD - Provide refined HVT list for wargaming and evaluation of HPTs.

Figure III-12. Key Points Step 4

b. The primary purpose of CM is to answer the commander's IRs by making the best use of scarce RSTA assets. CM's secondary purpose is to answer IRs from other intelligence users. IRs orient on intelligence required to: prevent surprise, support planning, support decision-making during execution operations, and support engagement of HPTs. To be useful, the information being gathered must be relevant, accurate, analyzed, properly formatted, and disseminated in a timely manner to the appropriate user.

c. The link between IR originators and the sensors/collectors themselves is the collection manager. The collection manager is responsible for translating IRs into effective collection strategies; therefore, it is paramount that collection managers clearly understand what the requester needs.

d. In theater, IRs originate from intelligence analysts, targeteers, combat assessment, and combat operations planning at the joint force and component levels. They may also originate from external intelligence organizations, such as CIA, NSA, DIA, etc. In-theater IRs are products of decision making and target development planning processes. It is during these processes that IRs gain priority relative to how important they are to joint force's mission success. Collection managers participate in these processes and develop a list of PIRs for the JFC's approval. In joint operations, these collection management priorities are normally established at a daily meeting of collection managers chaired by the J2 or the J2 collection manager and approved by the JFC.

e. While TM related IRs are important, they do not have "full reign" over RSTA assets and must compete for these resources with other joint force IRs. It is the collection manager's responsibility to insure that the collection strategy developed fulfills the most important IRs first, and most completely, using all available RSTA assets. If countering

TMs is one of the highest priorities, the IRs developed during the TM IPB process become part of the JFC's PIRs. If TMs are not a high priority, it is still possible some of the information requested can be gathered by integrating the requirements into existing or planned collection efforts (commonly referred to as "piggybacking").

f. The CM Process.

(1) Collection managers use PIRs to begin the CM process. There are six collection management functions that are managed under two headings: Collection Requirements Management (CRM) and Collection Operations Management (COM). The six steps outlined in Figure III-13 depict how collection managers participate in formulating collection requirements, submit those requirements through appropriate channels to the collectors, and monitor/manage/track all activities required to satisfy those requirements. CRM prioritize competing requests for information (RFI) based on the JFC's guidance and objectives and keeps the collection strategy synchronized with the overall campaign (Figure III-9, Steps 1 and 6). COM develops the collection plan, tasks collectors, disseminates results, evaluates ongoing operations (Figure III-9, Steps 2 through 5), and assists CRM in keeping the strategy up-to-date (Step 6).

(2) Steps 1 & 2 are most critical because they determine how PIRs are translated into specific information requirements (SIRs) and then into specific orders and request (SORs) for transmission to collectors. Poorly written PIRs do not produce well-defined and focused SORs. If PIRs are poorly written, the collection effort will not likely produce the information needed to fill the intelligence gap. Good PIRs have several things in common—they ask only one question; they focus on a specific fact, event, or activity; and they provide intelligence required to support a single decision. Table III-3 indicates the information necessary to make IRs complete and precise.
NOTE*: In completing the "why" portion of the TM IR request, it is important to include in the justification that it supports force protection operations***.**

g. Collection Strategy Development.

(1) Four key characteristics of a good collection strategy are redundancy, mix, cross-cueing, and integration.

(a) *Redundancy* implies the use of several same-discipline assets to cover the same target. Redundancy is used against high priority collections when the probability of success by any one system is low and to improve the chance of obtaining a more accurate position location of the target.

(b) *Mix* means providing complementary coverage by combining assets from multiple disciplines. Sensor mix increases the probability of collection, reduces the risk of successful enemy deception, facilitates cross-cueing, and provides more complete reporting.

(c) *Cross-cueing* involves using one or more sensor systems to "cue" or direct other sensors on "where to search." Sensor cross-cueing refers to automatic or semi-automatic redirection of a sensor's specific search area.

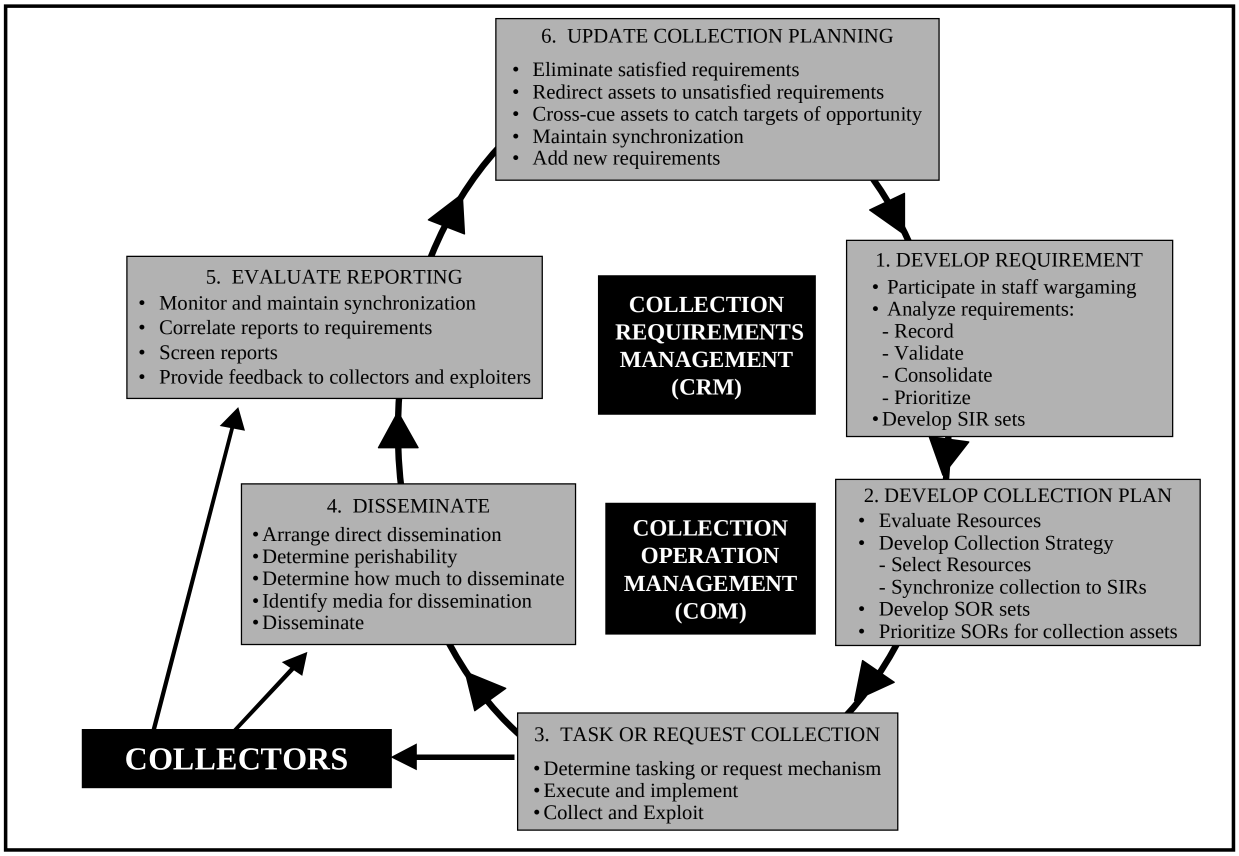


Figure III-13. Collection Management Functions and Process

TABLE III-3. PIR Information Requirements.

WHAT?	Activity or indicator. Also include accuracy required for targetable data.
WHERE?	NAI or TAI location.
WHEN?	Time the indicator is expected to occur.
WHY?	Justification for requesting the information.
WHO?	Who needs the results?
BY WHEN?	How quickly is the information needed?
MEDIA?	What is the desired format for the information; that is, report, briefing, multi-media, verbal, direct feed, etc.?

• Cross-cueing requires that the platform hosting the sensor be in view of the new collection location or able to move within collection range within available time windows. Automatic redirection is cross-cueing based on pre-established criteria that conform to collection priorities. Semi-automatic redirection means an operator is “in-the-loop” to redirect the sensor to the new collection location manually. This decision is based on an indicator from another source and whether the cross-cue satisfies pre-established conditions (such as higher priority tasking, etc.). Cross-cueing can be intra-platform (multiple sensors on single platform), inter-platform (between two sensor platforms), or some combination thereof from ground-based, airborne, and/or overhead systems. Sensor cross-cueing is highly dependent on dissemination architectures, sensor system design, and operator training. Although cross-cueing may only change the sensor’s

search area temporarily, the value of any lost intelligence during this period must be weighed against the expected value of the new intelligence gained. For example, if a sensor is in the process of monitoring an event as it occurs, cross-cueing the sensor at that particular moment might result in a complete loss of information about that event. Because an "informed" operator-in-the-loop is needed to make these type of decisions, the amount and type of automatic cross-cueing is normally limited.

• Cross-cueing is very important to TM IPB and target development. This can be especially true for locating FOLs and FOBs. For example, a TM launch location provided by Defense Support Program (DSP) satellite warning or "hit" can be cross-cued to a platform employing a ground movement target indicator (GMTI) or other applicable sensor system. This sensor would then monitor the TEL's movement and track it back to the transloading site and then, in turn, track the ground support vehicles back to the FOL or FOB.

(d) *Integration* means bringing new, higher priority or existing lower priority requirements into planned or ongoing missions. Integration helps avoid undertasking very capable assets and reduces disruption of the overall collection strategy caused by dynamic retasking.

(2) Dynamic Retasking

(a) Dynamic retasking refers to changing a sensor's collection focus while it is actively engaged in supporting collection requirements established prior to its current mission. Like cross-cueing, the value of the collections lost as a result of dynamic retasking must be compared with the value of the new intelligence gained. Sensors are not normally dynamically retasked unless the new requirement meets a higher JFC priority and the particular system is capable of being retasked in time to fulfill the new requirement. For overhead collection systems, dynamic retasking is normally limited to changing the sensor's "boresight."

(b) Dynamic retasking may also require that the platform hosting the sensor be moved to within viewing range of the new collection area. For airborne assets, this means changing the track the platform is flying in order to support the new collection requirement. Current UAVs are generally the most flexible asset but have longer transit times because of low airspeeds. Overhead asset "orbits" or a U2's "track" cannot be altered quickly and therefore are usually not considered for dynamic retasking when the "orbit/track" requires alteration. (NOTE: The U2's onboard sensors are capable of being cross-cued or dynamically retasked when a flight path change is not required). The flexibility of other airborne assets may also be constrained by self-protection and airspace deconfliction issues. UAVs are vulnerable to the same air defense threats as manned aircraft and therefore require the same IPB considerations when determining safe flight routes. These issues must be carefully considered when deciding to dynamically retask a collection asset.

(3) Cross-cueing and dynamic retasking require collection managers to maintain "sensor situational awareness," that is, a picture of where sensors are, their capabilities, range, etc. Sensor SA is still mostly a manual process. This impedes flexibility and the responsiveness of the collection management system. Several near-term systems may improve these shortcomings.

h. CM Focus.

(1) CM processes for peacetime, crisis, and conflict do not differ greatly. However, the level of hostilities will change the focus of the CM effort and number/types of RSTA assets available for collection tasking.

(a) Peacetime CM

·• CM during peacetime has two purposes: acquiring sufficient database information to permit analysts to develop a credible IPB and developing plans for employment of RSTA assets during crisis and conflict. Peacetime TM collection efforts will generally focus on facilities related to research, development, test, and evaluation (RDT&E), production and manufacturing, national storage sites, import operations, supporting infrastructure, doctrinal information, training and exercises, and strategic TM operations.

·• RSTA assets will likely be constrained during peacetime due to overflight restrictions and worldwide commitments. However, there is no prohibition against planning for periods of crisis or conflict. TM analysts and collection managers develop on-the-shelf collection plans that include provisions for RSTA assets needed to quickly "mature" the TM IPB and monitor TM forces in garrison before they deploy.

(b) Crisis CM. Monitoring TM activity during the early stages of a crisis is critical. If hostilities appear imminent, the adversary will likely deploy TM forces to dispersed locations to prepare for their employment and to protect them from attack. Available in-theater RSTA assets, as well as other national technical means, must watch for the deployment of missile forces and, if possible, track them to their various operating areas. Having an on-the-shelf crisis collection plan that includes TM NAIs is essential.

(c) Conflict CM. Once conflict begins, the CM effort in support of TM target development shifts from the strategic to the tactical. Strategic TM targets (normally fixed) developed during peacetime planning should already be included in the initial attack strategy, air tasking orders, target list, and collection assessment requirements. If the enemy has already dispersed the missile forces, these attacks against strategic fixed-targets will have only minimal immediate effect on launch operations, but may affect the adversary's ability to reconstitute forces. During crisis, the key to effective TM collection efforts is establishing a near-real time intelligence feed and responsive cross-cueing procedures for sensors.

(2) It is important to note here that RSTA operations (with exception) do not generally collect intelligence. Rather they collect data that becomes intelligence after it is processed, evaluated, and integrated (fused) with other pieces of information and data. When dealing with a mobile TM threat, the classic intelligence functions of collection, situation awareness, analysis and production, and target development must be compressed in time, level of detailed analysis, coordination, and decision making. Figure III-14 shows the cognitive hierarchy associated with these tasks. **Tactical TM activities produce perishable intelligence information. Unless the TM analyst knows what to look for and, can see and interpret events in near-real time, it is unlikely that a proactive response can be developed before the opportunity disappears.** This means that direct dissemination of data to TM analysts and targeteers is essential to

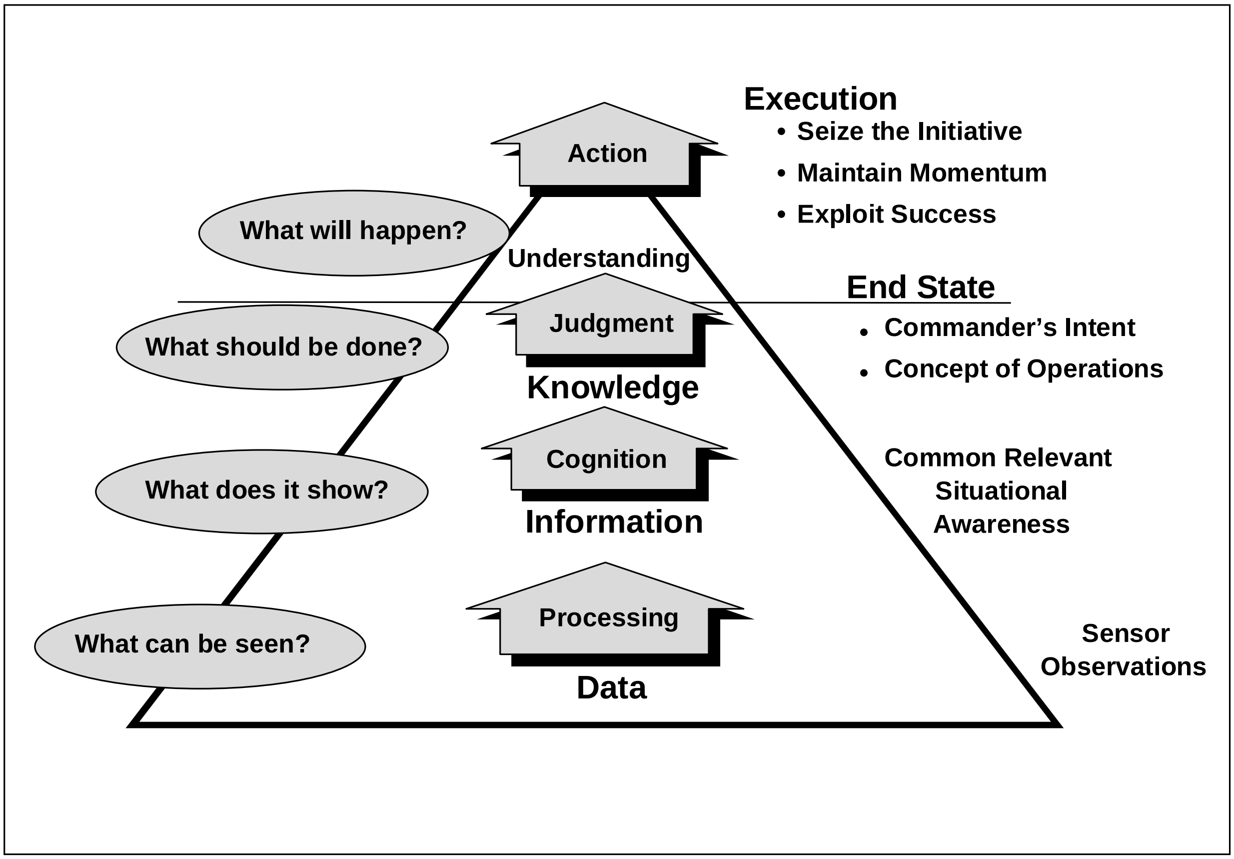


Figure III-14. Cognitive Hierarchy Associated with RSTA Tasks

success. TM analysts and targeteers need direct input into the cross-cueing and dynamic retasking processes when countering TMs is a JFC priority.

(3) To be effective, the planned wartime collection architecture must be exercised during peacetime. Unless exercised routinely, connectivity cannot be guaranteed and data stream problems identified and resolved. Without pre-conflict testing and effective management, communications paths can quickly become saturated by duplicative information, greatly hindering the analysis and production efforts. Figure III-15 illustrates the complexity of collections and intelligence information pathways that exist in support of operations during crisis or conflict. The dashed line indicates coordination, the solid lines with arrows at both ends indicate interaction (requirements development, coordination, communication, etc.), and the solid lines with a single arrowhead indicate tasking or passing of information or requirements. Continuous coordination and cross-talk is critical between CMs, intelligence analysts, personnel involved in combat assessment, targeteers, and the operational decision-makers to ensure that all of the information gaps are identified and covered. During peacetime, interaction between these various sections occur during intelligence briefings and through established daily working relationships. During crisis and conflict, much of this interaction occurs at daily CM or JTCB meetings**.** Extra "TM-focused" meetings that bring the theater and component TM players together to synchronize intelligence, collection, and target development operations are also essential.

(4) Besides understanding the CM process, it is equally important to understand RSTA capabilities and limitations. Appendix A contains information on

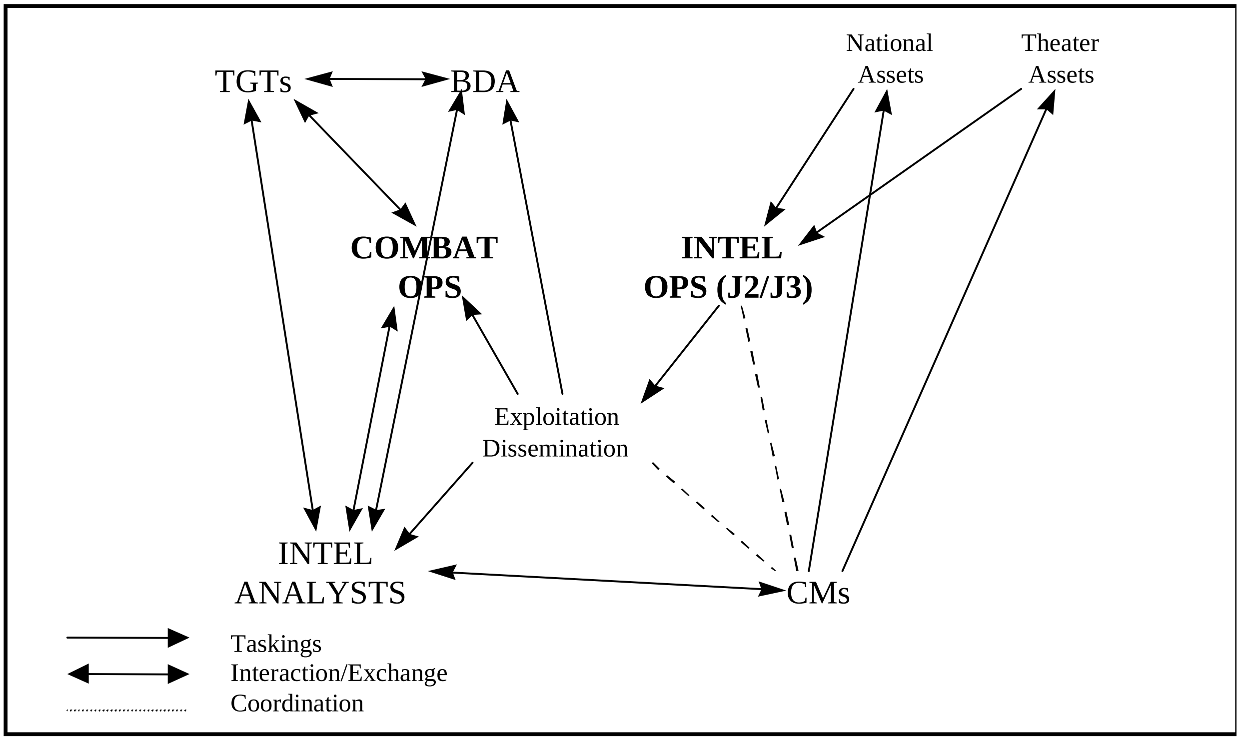


Figure III-15. CM Relationships

sensor considerations to aid the development of a TM collection strategy. A critical RSTA asset to TM IPB is HUMINT, especially SOF. Sensors cannot replace the quality of intelligence from "eyes-on" observations. Appendix B contains information on SOF employment in support of JTMTD and direct action.

(5) Near-real-time intelligence collection is the key to turning IPB templates developed during peacetime into a near-truth TM intelligence picture. Figure III-16 diagrams the CM decision-making process in support of JTMTD. How well the TM IPB and CM processes are "harmonized" will determine the quality of predictive intelligence and whether target nominations can be produced and executed within the short window of opportunity presented by TMs.

5. Target Development

a. Target development is the third aspect of JTMTD. While TM IPB and CM are important in determining which COA the enemy has chosen and what he is doing where, unless this information is "acted upon" within the required timelines it is irrelevant. Target development is the process of turning intelligence information into target nominations. Target development is the second step in the joint targeting cycle (Refer back to Figure I-1 in Chapter 1).

b. Target Identification and Nomination.

(1) As discussed at the beginning of this chapter, after the TM attack strategy has been refined and approved, targeteers use the tasks and subtasks to define appropriate target system components and HPTs. HPT target nominations (supported by target folders

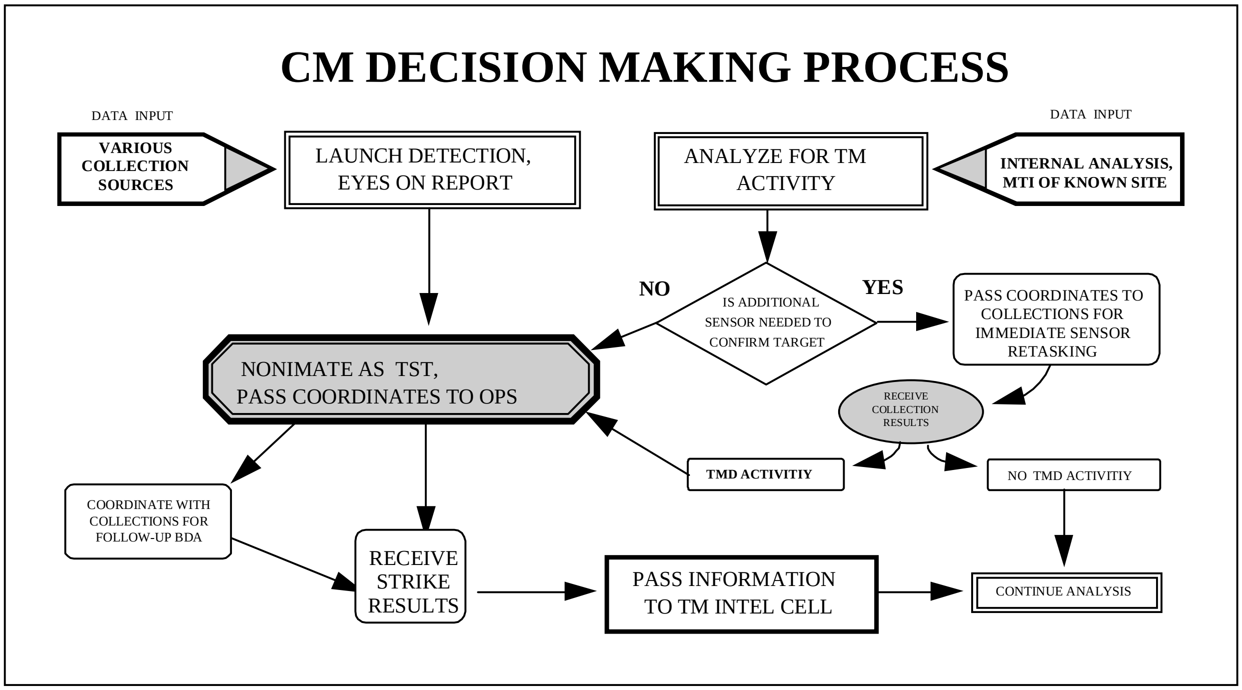


Figure III-16. CM Decisionmaking Process

or lists) are developed in as much detail as possible and refined as additional information becomes available. Preplanned target nominations are approved according to the procedures established by the JTCB or established target coordination forum. If TMs are designated as high priority, components prosecute immediate TM target nominations within their AO and coordinate with other components as necessary for execution or target handoff.

(a) Peacetime Target Development. Peacetime target development should focus on two aspects of the target system—infrastructure and potential operating areas. If TMs are accorded high priority for national and theater collection/intelligence production, much of the TM infrastructure (such as the missile force's garrison facilities, weapons storage depots, LOC, production facilities, etc.), can be identified, validated, and nominated for attack prior to hostilities. Detailed information on targets, to include weaponeering solutions produced by appropriate Service component operators, are built and maintained on air tasking orders and target lists for immediate use at the onset of hostilities. Based on the TM IPB, potential tactical operating areas for the missile forces (such as potential FOB locations; transload, launch, and hide sites; countermobility targets; etc.) are also "weaponeered" and put on-the-shelf. During crisis and conflict, these pre-planned targets can be quickly validated and nominated for execution. This pre-planning effort will require a substantial commitment of manpower and collection resources but is critical to attaining successful pre-launch attack operations.

(b) Crisis and Conflict Target Development. Once a crisis begins, additional RSTA assets planned for during peacetime CM analysis will become available. These RSTA assets will help confirm targets anticipated during peacetime TM IPB efforts. On-the-shelf target nominations are then quickly completed and nominated for execution. While peacetime JTMTD efforts will provide an initial list of fixed-targets, the majority of the

mobile target system components will only emerge after hostilities commence. As the TM IPB process narrows the focus of collections, fleeting targets such as TELs and GSE should emerge. If the opportunity exists, these targets can be immediately nominated for attack as TSTs. Even if they cannot be attacked immediately, these components of the TM target system should be "tracked" by sensor systems to help develop the TM intelligence picture. If a post-launch TEL can be tracked to its hide site, it can be attacked there; or better yet, perhaps it can be tracked to a transload site and attacked there, or the transload GSE tracked back to the FOL or FOB to discover the operating network. Once there is confirmation that the enemy is using a particular TM operating area, further area delimitation analysis may provide good countermobility targets for interdiction of the mobility network.

(2) The countermobility concept capitalizes on the enemy TM's greatest vulnerability - the requirement to bring components together to accomplish launch operations. Countermobility analyzes the TM mobility network in each operating area for points of interdiction that will keep components separated. Depending on the topography of the terrain, countermobility can be extremely effective. For example, if a TEL has difficulty moving from a hide site to its launch point, the launch may be delayed out of its approved launch window. Such a delay could be extremely important if the enemy is trying to saturate our defenses with salvo launches. Countermobility targeting also forces the adversary to find alternate routes to accomplish essential tasks. When forced into changing operating patterns, TELs and GSE become exposed for greater periods of time; thus lengthening the attack window of opportunity. Because GSE may have limited off-road capability, alternate routes may become very circuitous, further disrupting the enemy's OPTEMPO. Figure III-17 illustrates countermobility targeting options based on detailed mobility analysis. The success of this type of analysis is highly dependent on knowledge of enemy operating patterns derived from the IPB process.

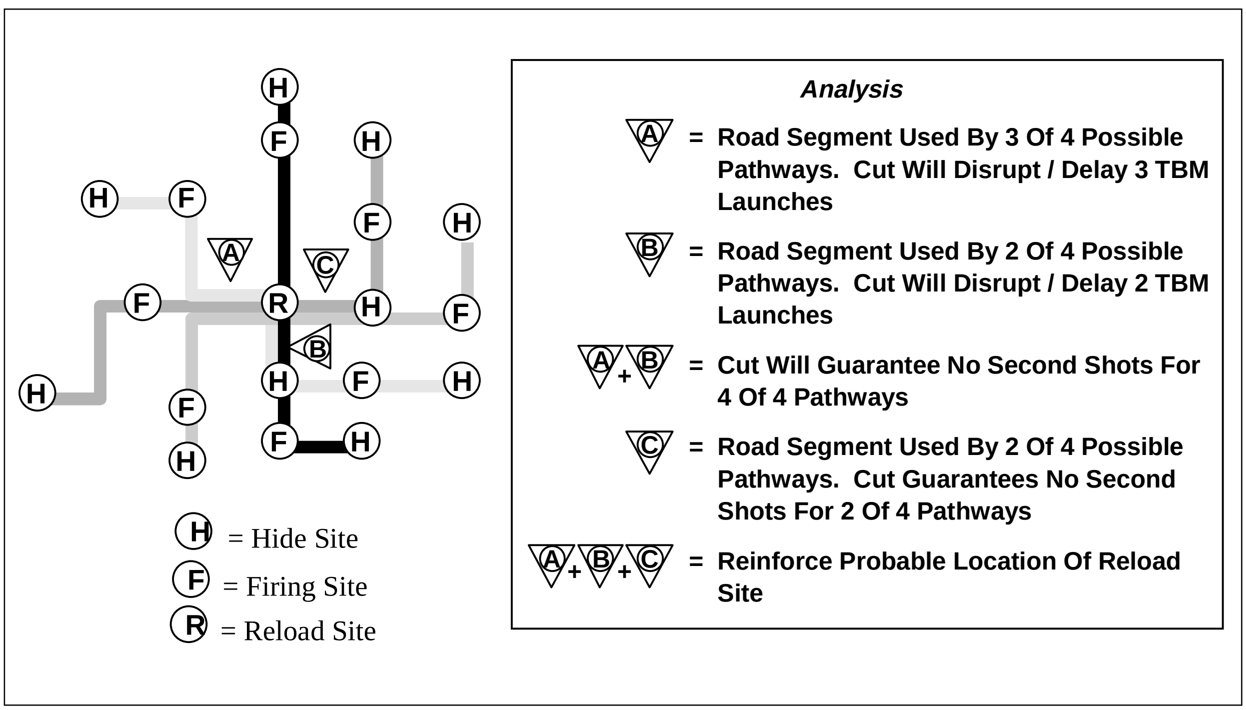


Figure III-17. CM Decisionmaking Process

(3) Combat Assessment (CA). Targets are also nominated based on the results of CA. These will be either known targets requiring restrike or new targets that arise as the overall attack strategy causes the enemy to react. As with all operations, pre-planned and effective CA is critical and affects the entire JTMTD process. Two key assessments which analysts must examine are the impact of friendly operations on the enemy's TM capability and the enemy's reaction in terms of changes to their operating procedures.

(4) TM IPB must be continuously updated to reflect changes to the enemy's TM order of battle, operating procedures, and results of infrastructure attacks (destruction of bridges, rail networks, etc.) that affect the enemy missile force's ability to operate. CA directly measures if the attack strategy is succeeding, whether a particular phase has been completed, or when strategy changes are required. For example, if a bridge is destroyed as part of countermobility targeting, it should be immediately incorporated into the area delimitation database and used to analyze how the enemy will react and where new HPTs will appear.

(5) There are three aspects of CA, each of which must be done correctly to determine the overall effectiveness of operations: physical damage assessment, functional damage assessment, and target system assessment.

(a) Physical damage assessment estimates the quantitative extent of physical damage through munitions blast, fragmentation, and/or fire damage effects to a target. This assessment, also called battle damage assessment (BDA), is based on observed or interpreted damage reported by the attacking force or component-level BDA collection efforts.

(b) Functional damage assessment estimates the effect of attack on the target's ability to perform its intended mission compared to the operational objective established against the target. This assessment is inferred on the basis of all-source intelligence and includes an estimate of the time needed to replace or recuperate the target function.

(c) Target system assessment is a broad assessment of the overall impact and effectiveness of attacks against the entire target system's capability. It is also used to judge an enemy unit's combat effectiveness. A target system assessment looks at elements of the target system in comparison to the commander's stated operational objectives. Target system assessment is a relatively permanent assessment and is used for more than one mission.

(6) Strategy Assessment. The following indicators and measures can be used to assess the effect of friendly operations on the TM force:

(a) Physical Count: Enemy TM assets are subtracted from the OB based on CA estimates of targets destroyed/damaged. While this is the most straightforward means of measuring success, the complete reliability of such numbers has generally been proven false during combat. Nevertheless, it is important to maintain an accurate count of the TM OB in order to assess remaining TM capability.

(b) Reduction in TM Launch Rate/Volume: This indicator is easily observed and measured and can provide insight into the TM force's current capability. A significant reduction in the launch rate may indicate attrition of launchers/missiles, disruption of TM logistics, or a deliberate reduction to reduce exposure to attack. This may also indicate a change in enemy strategy or intent.

(c) Shift to New Operating Area: This may indicate change in operations due to threat and/or loss of key infrastructure. It may also indicate the adoption of a new strategy, that is, a shift from strategic or political targeting to focusing on tactical units.

(d) Reduction in TM Accuracy/Effectiveness: Degraded accuracy, missile in-flight failures, and use of inert warheads may indicate a loss of preferred firing locations and/or a disruption of the TM logistics system.

(e) Shift in Timing of Launches: A temporal change in the launch pattern (that is, from day to night operations) may indicate a change in operations in response to attacks.

c. Deception. Deception is an integral part of all TM operations because it is the key to survival. During TM IPB it is important to consider what options the enemy might employ to deceive us as to their intentions and physical operations. Deception operations range from misinformation about capabilities and range of systems to decoy launchers deployed in likely launch areas. While it is impossible to characterize all possible CCD methods, it is important to consider all possibilities in the context of the battlespace. Intelligence information that appears "out-of-synch" should be analyzed in this light. It is necessary to question every piece of information and learn something from every TM event so that the deception will become intuitively obvious.

d. Attack Platforms. Once targets are identified, confirmed, and nominated, there are a variety of weapons systems available to engage TM targets. While it is not the intent of this publication to go beyond the target nomination process, the attack system selected does have a direct bearing on the scope of intelligence required (that is, imagery requirements, target location accuracy requirements, etc.) It is important to emphasize that each Service brings unique capabilities to the fight. In support of the mission, the goal must be to maximize the use of each system's strengths according to the circumstances. The following is brief description of attack platform options:

(1) Fixed Wing Attack Aircraft (Fighters and Bombers): **Air Force, Naval, and Marine aircraft provide advantages of speed, range, and flexibility in responding to both preplanned and TST targets.** Trained aircrews can extend a weapon system's capability against moving targets or those that can quickly relocate. A wide variety of munitions with varying precision, weapon effects, penetration, and area-denial capabilities can be optimally delivered against specific elements of the TM target system. Risk management considerations for crew exposure must also factor into employment, although stand-off weapons further reduce exposure time.

(2) Surface-to-surface tactical missiles: The Army Tactical Missile System (ATACMS) is an all-weather, day or night, semi-ballistic, guided missile armed with anti-personnel and anti-material bomblets designed to engage soft, stationary targets at

ranges out to 300 km. The ATACMS can engage TSTs or preplanned targets when precise target location data (within 150 meter accuracy) is available. ATACMS require little time to accomplish fire direction calculations and have a relatively short time of flight. ATACMS should be considered for use against targets protected by a sophisticated enemy air defenses when risk to aircraft and personnel are high. For example, a well-defended FOB is an excellent ATACMS target if within range. Airspace deconfliction requirements are a major consideration when employing ATACMS. Procedures for establishing airspace control measures for ATACMS are discussed in MTTP, *The Joint Targeting Process and Procedures for Targeting Time-Critical Targets, July 1997.*

(3) Cruise Missiles: Cruise missiles such as TLAM and CALCM can be employed against high-value stationary targets in highly defended areas. However, these systems require precise coordinates and a considerable amount of lead-time for planning. TLAM and CALCM are effective against a variety of stationary TM-related vehicles and support equipment. Standoff delivery methods and precision strike against fixed/stationary targets are a primary advantage of cruise missiles.

(4) SOF: SOF provides a low-signature operation to fill gaps in sensor coverage, in order to support target identification and acquisition through: Special Reconnaissance (SR), direct observation, tactical SIGINT collection, and precision emplacement of Unattended Ground Sensors (UGS). Additionally, SOF can facilitate attack operations through target acquisition/terminal guidance for airborne platforms and, as necessary, direct action. Risk management considerations for SOF exposure and survivability considerations for delivery aircrews must also factor into employment. For a more complete discussion, see Appendix B.

(5) Attack Rotary-Wing Aircraft: The AH-64 (Apache) is a day/night adverse weather attack helicopter that employs an array of rockets, missiles and cannon fire. The Apache has a combat range of approximately 670 km and a stand off range of 8 km. The AH-64 can conduct “search and attack” missions against targets when the target location has not been sufficiently refined to permit engagement by other attack systems. Depending on the range to the target area, an AH-64 battalion can spend approximately 1-2 hours searching an area in which enemy TM forces are known to be operating. The Apache is equipped with sophisticated night vision, navigation, and target acquisition systems to locate targets not readily visible and can be teamed with other sensor systems to refine search areas.

(6) Non-lethal Attack Options: A variety of non-lethal means are available to support and enhance targeting of the TM target system. Portions of the TM C2 system may be vulnerable to a variety of electronic and information attack. Psychological operations (PSYOP) and deception operations may be beneficial as well. Weather data collected by TM-related radar systems may be vulnerable to direct jamming. Combining both lethal and non-lethal forces can enhance the overall TMD strategy.

(7) The JFC must take advantage of all attack platforms, to include multinational assets. Multinational operations serve to expand and enhance the availability of lethal and non-lethal weapons systems for TM target engagement.

6. Conclusion

The JTMTD process defines the relationship that must exist between TM IPB, CM, and target development to achieve the desired end state for attack operations – reducing or preventing enemy TM launches. While on the surface the harmonization of these three processes appears simple, in reality, the operational architectures, databases, resources, and enemy's efforts to elude detection make it very difficult. The processes described can help establish a common perspective of TM target development procedures for everyone involved in countering TMs.

Attack Operations During World War II

During the war, RAF Fighter Command, 2nd Tactical Air Force, and the US 9th Air Force conducted a variety of missions (Codename CROSSBOW) against the Nazi V-2 threat. First, fighter planes and ground attack aircraft flew armed reconnaissance patrols over known or suspected V-2 operating areas (a "V-2 Combat Air Patrol [CAP]") for the purpose of hunting for fleeting target and maintaining a threatening presence to disrupt and suppress V-2 operations. Fighter/bombers and light bombers were used to deliver pre-planned strikes against specific missile-related targets. Also, ground attack aircraft attempted to interdict rail traffic moving into and within the V-2 operating areas. Finally, specially equipped light bombers also flew a small number of night intruder missions against suspected CROSSBOW targets.

No missile firing units were ever attacked during launch operations, despite the fact the V-2 CAP sometimes reached levels as high as 100 fighter sorties per day over suspected missile unit operating areas. As was the case with the V-1 CROSSBOW effort, the attack operations missions that had measurable impact on the volume and rate of missile fire involved air strikes against the forward support elements and supply lines of the V-weapon forces.

One such mission occurred in February 1945 over a large wooded park in The Hague called the Haagsche Bosch. Dutch underground had reported substantial V-2 activity at this location, and Allied photo-reconnaissance flights had also occasionally spotted groups of rockets in the area. On the recommendation of his chief intelligence officer, Air Marshal Hill of Fighter Command decided to abandon combat air patrols for several days and use his strike resources for a concentrated attack on the park. The Haagsche Bosch, with its natural cover and proximity to a rail line turned out to be the site for a Nazi missile technical battery. According to Nazi accounts obtained after the war, the February attack damaged a number of missile transporters, rockets, the special gantry crane used to transfer missiles, and the missile checkout station located in a large sound stage of a Dutch film studio adjacent to the park.

The average launch rate from The Hague during February 1945 was approximately ten missiles per day. After the Fighter Command air strikes went in on February 21 and 22 (after a one day gap during which the missiles already at the launch units were used up), firing essentially stopped for several days while the technical battery moved to a new location and received replacement equipment.

-- Dr. Ron Allen, Sandia National Lab
based on *United States Strategic Bombing Survey*, January 1947

Chapter IV

JTMTD INTEGRATION OPTIONS

> "TMD is inherently a joint mission. Therefore, joint force components, supporting combatant commanders, and multinational force TMD capabilities must be integrated towards the common objective of neutralizing or destroying the enemy's TM capability. This must be integrated into and in support of the JFC's overall concept of operations and campaign objectives."
>
> -Joint Publication 3-01.5, *Doctrine for Joint Theater Missile Defense*

1. Background

a. JTMTD, as described in Chapter III, is a process derived from the synergistic outcome of melding TM IPB, CM, and target development processes into a cohesive strategy to achieve the JFC's object in regards to attack operations against TMs. As noted in the preface, countering TMs is not a mission area itself, but rather a problem that cuts across many operational and component lines. It is an inherently joint mission.

b. In examining ways to integrate JTMTD efforts, it is necessary to understand capabilities and limitations of current technology and force structure. Current architectures and methods have not proven effective in reducing or preventing enemy TM launches. While some reasons for this ineffectiveness stem from the lack of interoperable systems, a significant percentage of the problem can be traced to deficiencies in joint training and joint personnel training programs. Developing TTP "work-arounds" to interoperability problems requires staffs to explore and experiment with various options, that is, work to find joint solutions rather than single-Service remedies.

c. The need for an integrated approach to JTMTD needs no justification. Because multiple intelligence organizations – national, theater, JTF, and component – have a need for TM intelligence, the goal of JTMTD must be to create a mutually agreed upon, comprehensive, and accurate TM picture. This requires effective integration of all JTMTD efforts to accomplish the following:

(1) Ensure a **single** TM IPB, CM, and targeting effort.

(2) Expedite access to decision makers for dynamic re-tasking of sensors.

(3) Reduce duplication of effort.

(4) Prevent information from being "stove-piped" instead of shared.

d. The above quote from joint doctrine acknowledges the need for interoperable intelligence operations. However, currently fielded technology has limited capabilities in terms of developing a commonly shared, near real-time TM IPB picture. This chapter explores integration options that are feasible given the constraints of current systems.

> "The intelligence function is carried out through a geographically dispersed network in which national and service systems are interconnected to form a disciplined and responsive information gathering and dissemination structure. Though the functional systems may be dissimilar, interoperable communications and software must be provided to allow them to operate most effectively."
>
> - Joint Publication 3-01.5, *Doctrine for Joint Theater Missile Defense*

Theater Combatant Commanders (CINCs)/JFCs must task their staffs to explore these options with the goal of creating a more cohesive JTMTD effort. The options discussed are in practice in various theaters. Appendix D provides some information on theater-specific and deployable models.

2. Integration Options

a. TMD organization and integration varies by theater depending on forces available and threat capabilities. The goal of integration is achieved when a common picture of TM activity is established, TM data flows smoothly between C2 nodes, and fewer "work-arounds" are required to overcome hardware/software interoperability problems. Four methods for achieving an integrated JTMTD effort are—

(1) Consolidation.

(2) Collaboration.

(3) Liaison.

(4) Collocation.

3. JTMTD Integration Through Consolidation

a. Consolidating all "in theater" TM analysis efforts and equipping that effort with appropriate tools and access offers the best opportunity (given current technology) for producing planned and TST nominations within the attack windows of opportunity. A consolidated TM analysis element would also be responsible for fulfilling all JTF and individual component JTMTD requirements. When established, a jointly staffed Theater Missile Analysis Element (TMAE) serves as a single focal point for all JTMTD efforts. A single analysis element is beneficial because it improves communications, reduces misunderstandings between intelligence cells, reduces redundancy by maximizing use of limited resources, improves TM target production, and reduces manpower requirements. The TMAE works with existing intelligence, collection management, and targeting operations to produce TM target nominations. The location of the TMAE depends on the situation and organization of forces available. For example, in Combined Forces Command (CFC) Korea, the TMAE is located with the 7th Air Force Air Operations Center (AOC), which provides the core manning. Appropriate tasks for a TMAE are as follow:

(1) Conduct, update TM IPB.

(2) Recommend TM targeting strategy and target nominations.

(3) Provide TM situational updates to the JFC commander and components.

(4) Provide WMD situational updates to the JFC commander and component.

(5) Monitor SOF operations to coordinate CM activities and TM attack operations.

(6) Recommend a synchronized TM collection strategy.

(7) Coordinate dynamic re-tasking of sensors in support of TM TST target nominations.

b. A notional TMAE organization and associated responsibilities for each functional cell follows:

(1) TM Analysis Cell. Responsible for the following:

(a) Developing and continuously updating the TM IPB.

(b) Providing near real-time reporting of TBM launches and impact points.

(c) Maintaining interoperability of intelligence database systems.

(d) Identifying TM indications & warnings.

(e) Submitting IRs to collection management cell.

(f) Disseminating intelligence to components.

(g) Nominating TM targets to the targeting cell.

(h) Assisting with CA for the TM target system.

(2) Collection Management Cell. Responsible for the following:

(a) Tracking and responding to IRs submitted by the analysis cell.

(b) Maintaining sensor situational awareness.

(c) Developing, in conjunction with the JTF collection manager, a TM collection strategy. Provide requirements for cross-cueing and dynamic re-tasking to the collection manager.

(3) Targeting Cell. Responsible for the following:

(a) Developing, in conjunction with JFC/joint intelligence officer (J2)/joint operations officer (J3), a joint TM attack strategy and prioritizing targets that meet established attack strategy criteria.

(b) Maintaining a joint TM targeting database and target folders.

(c) Submitting target nominations to JTCB or appropriate TST agency based on the approved attack strategy.

(4) WMD Cell. Responsible for the following:

(a) Developing enemy NBC courses of action.

(b) Serving as the joint force NBC subject matter expert.

(c) Monitoring enemy use of NBC.

(5) SOF Liaison. Responsible for coordination between TMAE and SOF planning and execution elements.

c. To accomplish the tasks listed in paragraph 3a above, a TMAE requires, as a minimum, the following functions/capabilities:

(1) Terrain delimitation. Current processors available: Generic Area Limitation Environment (GALE), Engineer Operations Support (E-OPS), Interactive Battlespace Intelligence Server (IBIS).

(2) Near-real time imagery display for theater and national imagery. Current systems available: Time Critical Targeting Aid (TCTA), Multiple Input Sensor Terminal (MIST), Multiple Source Tactical System, Army (MSTS-A).

(3) Missile launch indications and electronic intelligence information. Current feeds available: Tactical Data Dissemination System (TDDS), and Theater Information Broadcast System (TIBS).

(4) Air situation awareness. Current system available: Air Defense System Integrator (ADSI).

(5) Connectivity to theater intelligence systems. Some current processors: All Source Analysis System (ASAS), Combat Information System (CIS).

(6) Target nomination processor. Current systems available: Advanced Field Artillery Tactical Data System (AFATDS), Rapid Application of Air Power (RAAP), Contingency Theater Automated Planning System (CTAPS), and Automated Deep Operations Coordination System (ADOCS).

(7) Collection management tool. Current system available: Joint Deployable Intelligence Support System (JDISS) with COLISEUM software.

4. JTMTD Integration Through Collaboration

a. A second method for achieving integration of the various JTMTD efforts is through "virtual" collaboration. While currently fielded technology has limited virtual-sharing

capabilities, the push towards better information technologies will make this option increasingly possible and will improve intelligence workload distribution. Virtual collaboration allows all analysts to share data simultaneously and keep the TM intelligence picture current. The following information discusses several possible techniques for improving JTMTD coordination and synchronization using existing systems.

b. The most rudimentary form of collaboration is via the telephone. Verbal cross-talk among TM analysts, collection managers, and targeteers over existing communications is simple and effective and can diminish misinterpretation of TM events. Telephonic communication, however, requires transcription of data manually and cannot provide visual exchange of information or transfer of massive amounts of data.

c. One virtual option currently available is the use of Intelligence Link-S (INTELINK-S) and JDISS. JDISS is a transportable workstation and communications suite that electronically extends a JIC to a JTF joint intelligence support element (JISE) or other tactical user. JDISS uses Joint Worldwide Intelligence Communications System (JWICS) connectivity to share intelligence production in near-real-time. JDISS terminals are normally located in the Sensitive Compartmented Information Facility (SCIF) and not with current operations intelligence activities. This makes real-time data sharing difficult. Nevertheless, JDISS can provide a virtual link and offers several applications.

(1) One technique available is the establishment of a TM "home page," if authorized by the J2, containing such information as the TM IPB database (OB data, templates and imagery), the base collection plan (PIR, essential elements of information [EEI], collection strategy, etc.), the approved attack strategy, and target information for use in preparing the air tasking order (ATO) or other plans, etc. The TM home page should also include "links" to information in other Department of Defense Intelligence Information Systems (DODIIS) such as MIIDB, automated message handling system (AMHS), and integrated production agency (IPA). The J2 designates the "web master" in charge of establishing and hosting the home page, and each component is responsible for helping to maintain the data by posting related intelligence products, to include target folders, for quick and easy access by others. Having a TM "home page" can also facilitate peacetime information exchange between the theater staffs and CONUS forces programmed for deployment.

(2) While the "home page" serves as a repository of current information, the multimedia collaboration manager (MCM) tool available within JDISS provides a forum for expanding verbal communications when necessary. MCM provides video teleconferencing capability (VTC), a keyboard chat room, and white-boarding capabilities ideal for exchanging IPB products, to include imagery, templates, and intelligence reports. This capability could also be used to host a daily Threat Missile Analysis Meeting (TMAM) via VTC using either JWICS or JDISS. This meeting allows analysts and operators to resynchronize the TM intelligence picture, coordinate TM collection priorities, and revalidate the overall attack strategy. The JISE Director could chair such a meeting for component operational planners and TM analysis representatives. Other participants should include the JTF collection manager and the joint operations center (JOC) targeting officer. Ideally, this meeting should precede the J-2's collection management meeting to facilitate the identification and consolidation of TM collection requirements.

d. Although currently not available, a joint, interoperable, automated target database system is needed to facilitate data exchange and target nomination. Currently each Service has automated targeting systems, but they are not fully interoperable. For example, the Army's AFATDS does not interface with the Air Force's RAAP or CTAPS programs. Efforts to correct these deficiencies are still in progress. Better virtual tools are also under development within the framework of the Global Command and Control System (GCCS) and other technological initiatives.

5. JTMTD Integration Through Liaison

The most common means of coping with today's integration problems is through the use of liaison officers (LNOs). When communication links are limited or are not fully interoperable, LNOs are critical. In regards to the JTMTD process, LNOs provide face-to-face coordination that can alleviate problems of miscommunication and lend expertise in terms of developing a joint attack strategy and a single TM intelligence picture. Each component LNO provides Service specific expertise, systems knowledge, and, in some cases, additional collection support. They can also provide connectivity between Service components that facilitates a cross-flow of time-critical information and can shorten response time. Both the sending and receiving organization must properly plan for LNOs. LNO requirements can be manpower intensive. Eventually, as new distribution and battle management capabilities are fielded, the need for LNOs may decrease. In the interim, LNOs often are the only connectivity between echelons capable of providing the degree of coordination required. See MTTP, *JTF Liaison Operations*, August 1998, for additional information on effective liaison.

6. JTMTD Integration Through Collocation

A final option to consider is to collocate TM intelligence activities. This option could be used in peacetime exercises to facilitate training, but has little practicality for deployed forces. Collocation presents a major security issue (a HPT for the enemy), and would require components to detach these elements to remote sites during actual hostilities. While collocation can be beneficial in training, it does not replicate the way we intend to fight and should be used with caution to avoid counterproductive training.

7. Conclusion

This chapter reinforces the need for JTMTD to be an imbedded and integrated process in joint force operations. The need for integration is readily apparent, especially in light of past performance in wartime and exercises. Given the current limitations in force structures and available collection systems, we cannot afford self-conflict and unnecessary redundancy. This chapter outlines "options." Regardless of which option the JFC chooses to implement, the goal must remain to develop a comprehensive target development strategy based on a sound TM IPB supported by a responsive collection system.

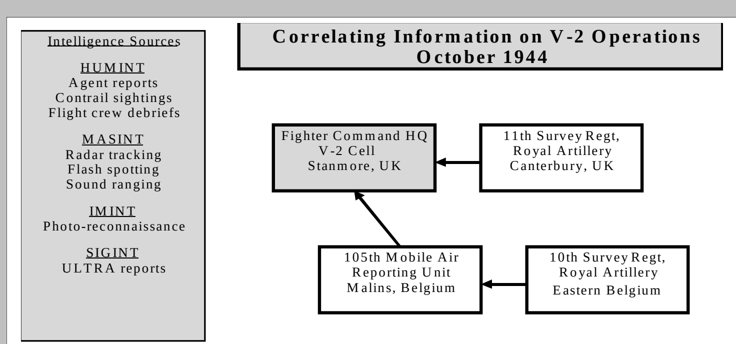
All-Source Correlation Cell at Fighter Command HQ - WWII

The ability of the V-2 units to stop operations at one location, move to a completely new operating area, and then resume launching within a few days was a crucial component of the Nazi campaign, especially at the outset in September 1944. In order to direct attack operations against the V-2 batteries, the Allies needed to quickly localize the new operating areas after the batteries moved. This problem proved to be more difficult than anticipated. One example that highlights the extent of the problem occurred on September 25, 1944, when a V-2 battery opened fire on Norwich and Ipswich, England. Initial Allied estimates of the battery's operating area ranged along an arc 100 miles in length. It took several days for the British to narrow the arc down and correctly identify the vicinity of Staveren, Holland, as the new operating area.

What was the problem? The British had established an analysis cell at Fighter Command Headquarters to correlate data from various sources to localize the V-2 launch areas. This analysis cell received data on missile tracks from air defense radars in the UK, flash-spotting and sound-ranging reports from a survey regiment on the English coast; and aerial photographic reconnaissance images of suspected launch areas. Once the actual campaign began, it was discovered that these sources were not sufficient to cover an attack originating at long range from the coast of Holland. Provisions were quickly made to enhance the information flowing into the "V-2 cell" at Fighter Command. The survey regiment brought balloons into use for their spotters in England. Spotters were also moved to the European mainland, together with additional missile tracking radar systems, to observe the V-2 launches at shorter ranges. A new unit was also set up near Brussels to pass on reports from these mainland sources through a direct communications link back to Fighter Command Headquarters. Missile contrail sightings by Allied bomber pilots flying past the launch areas were also added to the mix. The best new source was information coming in from the Dutch underground. New arrangements were made to get agent reports on missile force operations passed over to Fighter Command with minimum delay.

Once the front line stabilized in October 1944, the V-2 battery at Staveren displaced to southwest Holland to begin firing at London. Through this consolidated approach and with these new sources in place, Fighter Command knew about this move even before the first missiles were launched from the new operating area in The Hague.

-- Dr. Rob Allen, Sandia National Lab
based on *United States Strategic Bombing Survey*, January 1947



Appendix A

SENSOR EMPLOYMENT CONSIDERATION

To be successful at determining potential enemy TM COAs, TM IPB requires interface with, and support from national, theater, and tactical/organic sensors and surveillance system networks. The discussion of sensors in this appendix is broken out by intelligence disciplines as described by Joint Publication 2-0, *Joint Doctrine for Intelligence Support to Operations*, and focuses on how each discipline contributes to the JTMTD process. These discussions are, by design, general in nature and not specific to any particular AOR or sensor platform. They should be considered within the scope of the JTMTD process described in Chapter III of this publication.

1. Human Intelligence/Counterintelligence (HUMINT/CI). HUMINT is intelligence derived from information collected and provided by human sources. One key benefit of HUMINT is that it can provide an indication of enemy intentions. Counterintelligence is information gathered and activities conducted to protect against espionage, other intelligence activities, sabotage, or assassinations conducted by or on behalf of foreign governments or elements thereof, foreign organizations, or foreign persons, or international terrorist activities. The Defense HUMINT Service (DHS) provides HUMINT/CI intelligence as well as the CIA. During wartime, valuable HUMINT can also be obtained from activities undertaken by the combat elements of the joint force (for example, via pilot debriefings following attack operations missions and SOF). SOF as HUMINT is discussed in Appendix B.

a. Capabilities. Information gained from human sources can provide specific details of weapons systems, tactics, doctrine, and other data important for conducting TMD operations. HUMINT encompasses a broad range of potential data sources, including debriefings of enemy prisoners of war (EPW); information from government, military, and civilian persons within the target country; and/or third country persons. Strategic debriefs of persons entering the US and tracking international commerce (business, shipments, and labor) are means of collecting potentially useful data. US persons and organizations involved in activities abroad can also provide a wealth of current information. These include inspection teams, non-governmental organizations (NGO), private voluntary organizations (PVO), etc. Use of agents and low-level source operations (LLSO) are additional means of collection.

b. Limitations. Limitations of HUMINT include timeliness of collection, if in fact sources are available at all. The retasking process is slow and possibly impractical or impossible to accomplish. Additionally, HUMINT is subject to misinformation and the quality of information gathered is personality dependent.

2. Imagery Intelligence (IMINT). IMINT is intelligence derived from the exploitation of collection by visual photography, infrared sensors, lasers, electro-optics, and radar sensors such as synthetic aperture radar (SAR), wherein images of objects are reproduced optically or electronically on film, electronic display devices, or other media. Examples of IMINT

collection platforms include National Technical Means (NTM), U-2s, EP-3s, Joint Surveillance, Target Attack Radar System (Joint STARS), and UAVs.

a. Capabilities. IMINT provides the ability to monitor HPTs, including production sites, installations, and other significant points of interest. Imagery provides visual evidence and clues of activity and can convey a great deal of information. A variety of electro-optical (EO), infrared, and radar sensors are available, each of which has its own benefits and limitations.

(1) EO imagery (digital-based pictures) is useful for a variety of tasks, including searching broad areas for activity, terrain analysis and LOC studies. High resolution imagery can be used for detailed analysis of installations and equipment and for production of target materials.

(2) Infrared imagery is subject to the same atmospheric constraints as EO but can detect heat from vehicles, buildings, etc. Infrared can penetrate certain types of camouflage netting and can be combined with other types of imagery for better overall analysis. Infrared is also effective at night.

(3) Radar imagery is effective in daylight, at night, and in adverse weather. Radar imaging platforms are often the sole means of collecting during extended periods of poor weather. Radar is good for detection of vehicles in the field or other mobile targets and, depending on imagery quality, can aid in identification efforts.

b. Limitations

(1) Collected imagery requires interpretation by analysts in some form. Depending on the type of sensor, imagery analysis may be near real-time or take hours to exploit.

(2) EO and infrared imagery cannot penetrate clouds; also, other atmospheric disturbances can degrade their quality. Enemy CCD efforts may also make activities difficult or impossible for imagery analysts to properly discern, depending on imagery quality and the type of CCD applied.

(3) Radar imaging is subject to radar shadow in areas of rugged terrain. Also, features easily seen on EO imagery may not be as apparent to radar imagery.

3. Signals Intelligence (SIGINT). SIGINT comprises either individually or in combination all communications intelligence, electronics intelligence, and foreign instrumentation intelligence, however transmitted. Examples of SIGINT collection platforms include RC 135V/W (Rivet Joint), C-130 (Senior Scout), U-2s, EP-3s, and Guard Rail/Common Sensor.

a. Capabilities. SIGINT provides the ability to identify command, control, and communications nodes; aircraft; and integrated air defense system (IADS) components and other communications or electronic platforms. Collectively, SIGINT can identify unit locations and other key elements of enemy forces. SIGINT information can be used alone or to cross-cue other collection capabilities. SIGINT is useful in determining activities planned or in progress by the adversary that may not be detectable by other means.

b. Limitations. SIGINT is reliant on emissions intercept of communications or electronics. If an adversary is communicating via courier, landline communications, or encrypted means, interception may be impossible or difficult to exploit. If a radar is not operating, SIGINT sensors will not intercept. SIGINT is also subject to deliberate jamming or deception efforts by the enemy and can be affected by line-of-sight restrictions in some cases.

4. Measurement and Signature Intelligence (MASINT). MASINT is scientific and technical intelligence obtained by quantitative and qualitative analysis of data (metric, angle, spatial, wavelength, time dependence, modulation, plasma, and hydromagnetic) derived from specific technical sensors for the purpose of identifying any distinctive feature associated with a target. The detected feature may be either reflected or emitted. Examples of MASINT collection platforms include RC135s (Cobra Ball), DSP satellites, JSTARS, and developmental UGS such as Steel Rattler and Steel Eagle.

a. Capabilities. For many applications, MASINT means measuring some physical or chemical features associated with a target, analyzing the features to develop a characteristic target signature, and then comparing that signature to the entries in a pre-existing signature library to characterize or identify the target. This process can require specialized signal processing and data analysis techniques, which can be computationally intensive, although modern MASING systems are generally designed to accommodate this need. Different types of MASINT sensors are applicable across the full spectrum of TM activity. For example, nuclear, biological, and chemical sensors can be used to help with the detection of production and storage facilities and to characterize missile warheads. Seismic and acoustic UGS are excellent for the remote detection/identification of moving TM elements. Radar and radio frequency sensors can be effectively used to cross-cue other sensors and to detect, characterize, and track vehicles. Non-imaging infrared sensors can be used for TM performance characterization, launch detection, missile tracking, and impact point prediction and for contributions to the overall combat assessment process.

b. Limitations. MASINT characterization and identification of a particular target may depend on the prior acquisition of a unique signature for that target type. Some MASINT phenomena are detectable only at very short ranges, or through the use of specialized detection equipment; this may necessitate hand-emplacement of certain kinds of sensors. Limited availability of some types of MASINT assets places particular importance on thorough and constantly updated IPB to ensure the best possible coverage of TM force operating areas. Also, the timeliness of the information gathered can vary, depending on the capabilities of the MASINT sensors and their means of communication.

5. Open Source Intelligence (OSINT). OSINT is information of potential intelligence value that is available to the general public. Sources of OSINT include Defense publications, the World Wide Web (WWW), and Foreign Broadcast Information Service (FBIS) reports, etc.

a. Capabilities. Open source data is widely available through publications, electronic media, and broadcasts and is easy to access and analyze. Depending on the situation, reporting on events may be instantaneous as they occur. While a voluminous amount of data may be available for a specific area of interest, searching through it can be manpower intensive.

b. Limitations. One significant drawback to open source data is that it may be incomplete, outdated, and subject to misinformation/deception efforts.

6. Technical Intelligence (TECHINT). TECHINT is intelligence derived from the exploitation of foreign material produced for strategic, operational, and tactical level commanders. Technical intelligence begins when an individual Service member finds something new on the battlefield and takes the proper steps to report it. The item is then exploited at succeedingly higher levels until a countermeasure is produced to neutralize the adversary's technological advantage. There are various components of the DIA responsible for analysis and production of TECHINT, e.g., the NGIC, NAIC, and MSIC.

a. Capabilities. While TECHINT is not a source that can be directly used to locate elements of an opposing missile force, exploitation of equipment and systems gives valuable insight regarding the operational capabilities and limitations of the items in question. Therefore, TECHINT may materially aid the IPB process in a variety of ways.

b. Limitations. TECHINT is limited by the requirement to possess the equipment that will be exploited and by time required to achieve an effective countermeasure. TECHINT is not a source for locating elements in wartime.

Appendix B

SPECIAL OPERATIONS

This appendix provides guidance to the Joint Force Commander (JFC) and staff for the integration of SOF assets into TMD operations. Two caveats that must be considered in the employment of SOF are as follow: (1) there are no prepackaged SOF solutions available on request, and (2) the SOF mission profile in support of counter-TM operations is the same as many other target systems. This appendix also provides the non-SOF joint planner insight into considerations for SOF employment in order to facilitate friendly COA development, to include SOF integration.

1. Command of Special Operations Forces. The United States Special Operations Command (USSOCOM) and its components organize for war and contingency operations by providing Army, Navy, and Air Force Special Operations Command units to a JFC under the command and control of a Joint Special Operations Task Force (JSOTF). Service components of the JTF may receive any one of the following liaison elements to conduct tactical operations or facilitate planning:

a. Special Operations Command and Control Element (SOCCE).

b. Special Operations Coordination Element (SOCOORD).

c. Special Forces Liaison Element (SFLE).

d. Special Operations Liaison Element (SOLE).

2. SOF Integration Considerations. To effectively integrate SOF into TMD planning, SOF planners must have access to the following information:

a. How has the JFC organized the battlespace?

b. What is the assessment of threat TM capability?

c. What is the estimate of future threat TM capability as it pertains to quantity and capability improvement through foreign acquisition, domestic production, and operational reconstitution, to include WMD?

d. What are the probable threat TM COAs?

e. What effect will threat TM attacks have on the joint force's centers of gravity, and what conditions will result?

f. What are the JFC priorities for resourcing TMD?

g. How has the JFC organized and assigned functional responsibility to counter the TM threat with regard to target identification, acquisition, and interdiction; less SOF?

h. Who is responsible for organizing the TM collection plan and the TMD IPB?

i. Who is tasked with operational responsibility and control of TMD attack operations?

j. What conditions, natural and man made, adversely affect the joint force mechanism, less SOF, to counter the TM threat? This must consider all aspects of TMD.

k. What is the JFC guidance for SOF in support of TMD?

l. What resources are available to support SOF mission planning?

3. Force Optimization

A successful campaign to attack and neutralize an opponent's TM capability consists of two distinct aspects, intelligence collection and interdiction. To effectively integrate SOF, these aspects must be deliberately separated and the JFC's requirements for both must be evaluated against strategic and operational capabilities. **The discrepancies between theater/JTF intelligence requirements and collection capabilities become operational imperatives for focusing planning initiatives for SOF application.** SOF assets do not compete with other collection assets, but complement them by filling intelligence gaps that cannot be accomplished by other systems.

4. SOF Value Added

Economy and responsiveness define SOF "value added." SOF economy is not measured simply by its relatively small signature, but also by the extent they can be synchronized with other requirements and operations of other components. Responsiveness, on the other hand, does not imply "quick reaction" to a mission tasking measured in real time, but rather the ability to apply adequate force and appropriate action across the battlespace in time to ensure the favorable development of any emerging situation. SOF operations in support of JFC objectives include strategic and operational combat information collection, tactical SIGINT collection, and discriminate interdiction, either as a "stand alone" or as an enhancement to other attack platforms. During coalition operations, SOF combat advisory/trainer capabilities can effectively extend the theater SOF command, control, communications, and intelligence (C3I) umbrella by integrating multinational forces and/or guerilla forces.

5. Special Requirements

The environment at the limit of a JTF's operational range is characterized by limited or non-existing support for threat early warning, suppression, and recovery. SOF employment to locate, identify, and/or provide direct action destruction or terminal guidance operations against TM components can not be an afterthought. The ability of SOF to operate successfully and provide discriminate action in this environment depends on an intimate knowledge of, and interaction with, the natural and manmade conditions in the area of operations. To achieve this level of knowledge, SOF requires specific, detailed, and unique information about the battlespace. This information enables SOF to conceal or reduce the signature of their presence, thereby enhancing mission duration and survivability. RFIs generated during the SOF mission planning process must be given

priority. Additionally, all planning information used to recommend SOF inclusion in an operation must be forwarded to the SOF planners, along with the mission directives or orders.

6. SOF Placement

The process to develop NAIs and nominate them for SOF application must be deliberate and discriminate. Each NAI supports a specific PIR. A PIR should focus on locating HPTs such as FOBs or other key infrastructure critical to the enemy's ability to sustain TM launch operations. Planners use the points of known TM activity, combined with mobility analysis data and information about the enemy's operation procedures to determine where the greatest opportunity exists for observing TM operations. SOF may not be able to cover all NAI for survivability reasons. SOF coverage may be extended by use of UGS and other devices. The number of NAIs that can be covered will depend on SOF mobility as dictated by the tactical situation and force protection requirements. Mobility choke points between the tentative FOB and surrounding sites can serve as either point NAIs for SOF collection or possible countermobility interdiction targets to direct TM movement in the direction of SOF or designated engagement areas.

7. Special Reconnaissance

Early SR observation and reporting is essential to validate potential TM locations for additional collection and/or interdiction. SOF support to JTMTD for the initial phase of a war is especially critical and must be deliberately planned during peacetime to provide the responsiveness necessary to achieve pre-launch attack operations. In situations where the war is characterized by high-threat, high-intensity close battle, the JFC's operational focus will likely center on counterbattery and close battle operations. This situation creates a condition in which the JFACC may be compelled to concentrate on operations in the vicinity of the forward line of own troops (FLOT), resulting in diminished resources for supporting threat TM operations. Conversely, without a threat to their FOB and supporting infrastructure, the adversary's TM sortie generation rate and freedom to conduct launch operations remains unaffected. Relying on SOF SR operations to validate TM targets before diverting air assets is a viable technique to counter this problem.

8. Reporting

When and how SOF reports their findings can have a direct bearing on SOF survivability. The tendency to default to satellite communications (SATCOM) and near-real-time reporting pose a significant and often unnecessary risk for SOF from threat SIGINT. In the deep battle area, relay through an airborne platform (Airborne Warning and Control System [AWACS], HAWKEYE, etc.) reduces the interference of terrain masking, removing the potential compromise of SOF because of a forced relocation in order to establish a LOS communications link. It is important to remember that each TM target component has a different dwell time (the time it will remain in its current location). When targeting a FOB or other TM associated infrastructure that is semi-stationary, a SOF observation message delay of 1-2 hours is acceptable. Unless there is a critical event (FOL displacement, transload in progress, etc.), this delay should not have an adverse impact. When a TST, such as TEL is discovered, and if SOF has the ability to communicate directly

or indirectly to the JFACC, the option for terminal guidance operations (TGO) exists. Additionally, the assistance of an airborne controller can determine the best initial point (IP) for the attack to ensure that the risk to SOF personnel is minimized. SOF reports can be used to cross-cue other sensors, that is, used to associate moving target indicators (MTI) from Joint STARS or U2. This enables the tracking of otherwise innocuous activity and may help define TM OB and TTP in one part of the theater that apply to intelligence gaps at other locations.

9. Conclusion

SOF assets are truly a joint force multiplier. In some areas, JTF operations must be restricted to avoid third party provocation. Political sensitivity or restrictive weather may preclude JFACC air interdiction, leaving SOF as the lowest signature option able to both collect and interdict TM targets. There are numerous instances that present compelling reasons for SOF to take a more active role in interdiction through direct action (DA). However, the IPB must validate that the intelligence necessary to support detailed mission planning is available and that the additional risk of compromise can be mitigated by securing theater assets to facilitate the expeditious recovery of SOF personnel. Compromising SOF missions for missile destruction requires careful consideration.

Appendix C

QUESTIONS FOR TM IPB DEVELOPMENT

NOTE: This appendix contains a list of considerations for developing TM IPB. They are presented to help orient analysts and operators by providing relevant questions, which may need to be answered. **This list is not meant to be all encompassing.**

Focuses the TM IPB effort by accomplishing the following:

- Identifying significant characteristics of the environment.
- Defining the TM Area of Operations.
- Defining the TM Area of Interest.
- Explore enemy's options for using TMs across the spectrum of conflict

GOAL = Determine Intelligence Gaps; Define Parameters

1. Define the Battlespace Environment

a. Representative questions for identifying significant characteristics.

(1) How many launchers/missiles are available?

(2) What are the maximum, minimum and effective ranges of missiles?

(3) Where are likely targets for these missiles? Are they effective against this kind of target?

(4) Does the country produce their own launchers and/or missiles or are they imported? What type of reinforcement capability does the enemy have? (That is, does the country have the ability to rebuild equipment or purchase equipment from neighboring/ friendly countries?)

(5) What have been the threat country's attempts to acquire new missile systems and from where?

(6) Do TM forces have any special support requirements that will indicate the specific areas of operation?

(7) What areas provide the necessary prerequisites in terms of infrastructure, camouflage, cover and concealment to support TM operations? Which areas can be eliminated for lack of the same?

b. Representative question for defining the TM Area of Operations.

From what areas can the adversary conduct launch operations?

c. Representative question for defining the TM Area of Interest.

From what areas can the adversary expect support for the conduct of launch operations?

d. Representative questions for exploring enemy's options for using TMs.

(1) What are the enemy's primary goals for fielding a mobile missile force - political, military, economic, or a combination?

(2) What, if any, are the apparent political goals? For example:

(a) Influence peacetime regional/global politics?

(b) Deter potential hostile nations from attacking?

(c) Influence other nations during crisis or wartime (actual participation or political or economic support for belligerents)?

(d) Negotiate favorable cease-fire terms in the face of military defeat (threaten use)?

(3) What, if any, are the apparent military goals? Such as:

(a) Destroy enemy forces?

(b) Impact enemy OPTEMPO?

(c) Affect resupply or other rear area support operations?

(d) Conduct psychological operations?

(e) Employ long-range terrestrial and/or sea strike capability?

(f) Establish/maintain zones of control (cruise missiles)?

(4) What, if any, are the apparent economic goals? Like:

(a) Replace/supplant high numbers of conventional weapons with relatively inexpensive TM force?

(b) Export missiles/missile equipment?

(c) Force neighbors to make economic concessions?

(5) What are the likely adversary's targets for TMs? For example:

(a) Cities, population centers?

(b) Military forces in the field or naval vessels?

(c) Important installations for resupply and large fixed targets (ports, airfields, transshipment nodes, and storage areas)?

2. Describe the Battlespace Effects

Examines influences of the battlespace by accomplishing the following: • Conducting terrain analysis. • Conducting weather analysis. • Analyzing other characteristics of the battlespace. ***GOAL = Understand how aspects of the battlespace effect enemy TM and friendly COA***

a. Representative questions for terrain analysis.

(1) What are the likely areas of TM activity, considering the following?

(a) Ground slope?

(b) Elevation?

(c) Road accessibility?

(d) Vegetation/overhead cover?

(e) Soil trafficability?

(2) How do terrain factors affect enemy TM force operations?

(3) What areas support FOB activity? What types of road networks are required to support FOB activity? What are the terrain and other mobility limitations for the deployment of a FOB?

(4) What are the terrain/other mobility limitations for both launcher and support vehicles? What types of road networks are required to support resupply and transload activities?

b. Representative questions for weather analysis.

(1) What are the typical regional climatological factors affecting operations?

(a) Rain, snow, fog, wind?

(b) Heat and cold?

(c) Cloud cover and other atmospheric factors?

(2) How do seasonal variations in weather patterns change potential operating areas?

(3) How do climatological factors affect how TM operations are conducted in the field?

(4) How do typical weather patterns affect friendly force operations?

c. Representative questions for other characteristics of the battlespace.

(1) What is the current status of expressway and rail construction projects? What future projects are planned? How will this improved/deteriorated transportation infrastructure help or hinder TM operations?

(2) Where are missile units garrisoned? Where do they routinely train?

(3) Where are missiles stored?

(4) Where are the special weapons storage areas? Is there a signature that can be exploited?

(5) Where are the missile fuel storage depots? Is there a signature that can be exploited?

(6) Are warheads produced in country? Where? Is there a signature that can be exploited?

(7) Is there in-country production of chemical/biological agents? Where? Is there a signature that can be exploited? What are the key components of these chemical/biological agents? Where are they produced? Is there a signature that can be exploited?

(8) Are missiles or their components produced in country? Where? Is there a signature that can be exploited? If not produced in country, where are they assembled?

3. Evaluate the Adversary

Models enemy capabilities based upon known intelligence by accomplishing the following:

- Conducting OB analysis to include technical capabilities and limitations.
- Conducting mobility requirements (spatial) analysis.
- Incorporating temporal (timing) analysis.
- Examining TM doctrine and tactics to include target selection procedures, missile allocation, C3 techniques, navigation capabilities and limitations, and force protection assets.

GOAL = Develop doctrinal templates; identify HVTs

a. Representative questions for conducting OB analysis.

(1) What is the organizational structure of missile units (TO&E)? How many TELs comprise each battalion? How many and what type(s) of missile are available?

(2) What is the command structure for TM units?

(3) What is the status of the equipment? Serviceable? Poorly maintained?

(4) What level of experience do operators have in operating the equipment? Do they have "in-the-field" operational experience?

(5) What is the minimum/maximum range and maximum effective range of each missile?

(6) What type of warheads are available (high explosive, nuclear, biological, and/or chemical)? How many are there? Does the type of warhead effect storage requirements? Is there a particular signature to these warheads that can be used in collection efforts?

(7) What is the missile's accuracy? What is the circular, error, probable (CEP) of each missile type?

(8) What is the CEP of each warhead type?

(9) What special handling characteristics do the missiles require?

(10) Are missiles built in country or imported? If imported, are they pre-assembled or assembled once they arrive in country?

(11) What fuels are used (liquid/solid)? Are they produced in country? What kind, where and how? Do they produce a signature that can be exploited?

(12) What types of special, non-launcher vehicles/equipment items do missile units require? Do they produce a special signature that can be exploited?

(13) What types of vehicles are used to transport missiles and TELs? Civilian or military vehicles? Do they produce a special signature that can be exploited?

b. Representative questions for conducting mobility (spatial) analysis.

(1) What are the terrain and other mobility limitations for the deployment of a FOL or FOB?

(2) What are the operational ranges of launch units and support vehicles without refueling?

(3) What is the doctrinal distance between the launcher and its re-supply source?

(4) What are the doctrinal distances between firing sites and FOLs?

(5) What is the doctrinal distance between the FOL and the FOB?

(6) What is the maximum distance TELs operate from a FOB?

(7) What is the normal distance between a battalion support base and its brigade support base?

(8) When, where, and how do units fuel their missiles?

(9) When, where, and how are warheads mated with the missile?

c. Representative questions for incorporating temporal (timing) analysis.

(1) How do equipment-related requirements such as maintenance effect the tempo and sustainability of launch operations?

(2) What is the doctrinal rate of fire? What is the rate of fire for different warheads?

(3) What is the average transload time for a single TEL?

d. Representative questions regarding TM doctrine and tactics.

(1) Doctrine

(a) Does the threat TM force follow another country's doctrine or do they have their own?

(b) Are there any doctrinal considerations that affect the determination of firing positions, firing rate, and distances between firing units?

(c) What doctrine modifications has the threat made based upon weapon quantity/quality, weather factors, and terrain constraints?

(d) What are the doctrinal targets for TMs? Are launch units routinely given alternate targets?

(e) What historical use of TMs influences the threat's doctrine? What is the doctrine for NBC use? Does it change? If so, how?

(f) Are TM launch operations conducted in cooperation with air strikes or other missile/rocket launches?

(g) What is the re-supply rate in terms of missile availability per launcher? What is the organic quantity of "ready rounds" available per launcher? Where are the "ready rounds" kept?

(h) Do TM units have organic engineering equipment for construction of hide sites, repair of LOC, and mine removal?

(i) Do TM units plan to remain under an air defense umbrella during field operations? If so, what type of air defense systems will be responsible for this coverage? Do particular TM elements normally operate in cooperation with any ground or air defense unit? Does this provide a clue that can be collected against?

(j) When more than one launch is planned for the same time, is the preferred method to launch together from one location or to separate the TELs individually?

(k) What do launch point operations consist of? Does this produce an identifiable signature that can be collected against?

(l) What are the launch countdown timelines?

(m) What are the missile checkout techniques?

(n) Will the enemy employ from pre-surveyed or non-surveyed launch sites?

(2) C3I

(a) Where are the communications infrastructures that support TM operations?

(b) What is the primary method of communications between TELs in hide sites and next higher command element? What is the secondary method?

(c) How do higher command elements provide launch orders to TM field commanders?

(d) What type of communications will be used in emergency situations between launch, transload, and forward support personnel; and between commanders and the next higher command element. What types of field radios are used by TM elements and do all, some, or none have encryption capability?

(e) Do TM elements in the field attempt to stay close to any communications infrastructure?

(f) When TM launch elements are deployed, do they already have a launch plan in hand or do they receive them at the deployed site? What is the lowest organizational level at which discretionary launch authority is given? How does this change in the case of NBC vice high explosive (HE) warheads?

(g) Is there a standard plan to be used in case of disrupted launch operations? At what level is this plan formulated—battalion, brigade, or higher command authority?

(3) CCD

(a) **What does the threat country know about US intelligence collection, targeting, and attack operations capabilities?**

(b) What CCD does the threat employ with its TM force?

(c) What types of decoys are available and what are their levels of fidelity?

(d) Does the adversary prefer day or night launch operations? Have TM forces trained for night operations? Does operational employment change during poor weather?

(e) What force protection measures do TM forces employ before, during, and after launch?

(f) Are hide sites pre-planned or ad hoc?

(g) Do TELs hide alone or in groups? If so, how many and how close to each other?

(4) Logistics and Support

(a) How is propellant and oxidizer transported and stored for units in the field? Are there designated regional storage facilities established for this purpose and stocked for sustained operations?

(b) What preparations and activities are conducted prior to field operations?

(c) How are TM operations sustained in the field? Of what does the in-field support infrastructure consist? Are these permanent or ad-hoc missile support installations? What types of installations? What is the distance between support nodes? What is the dispersal within a specific node?

(d) How are transload operations conducted? Do the TELs transload at a FOL or FOB or do GSE deploy forward to transload TELs at tactical resupply points in the field?

(e) Where are NBC warheads stored? What special handling and security measures are taken with NBC warheads? Are chemical warfare agents in bulk storage or in filled warheads? Do they produce a signature that can be exploited?

(f) Are TM support operations conducted primarily during the day or at night?

(g) If forward support bases (FOL or FOB) are used during deployment, what are the stated requirements in terms of facilities? In peacetime, are these facilities in military or civilian installations?

(h) Is there a brigade-battalion-platoon structure and are there forward support bases at each of these levels? If so, are these further subdivided into separate support areas? How do the units move to the field? How does this take place- all at once or piecemeal? How can this displacement be best observed?

(i) How are other (non-transload) resupply and support operations conducted in the field? Do these operations produce an identifiable signature?

(j) What unique vehicles do TM forces use that are not found with conventional ground forces?

(k) What vehicles are used for warhead transport? Are they unique?

(l) How far are TM elements or supplies transshipped by rail for deployments?

4. Determine Adversary COA Options

Integrates previous three steps by accomplishing the following:

- Identifying the full set of COA available to the enemy.
- Evaluating and prioritizing each COA.
- Developing situational and event templates based on previous analysis efforts.
- Determining NAIs and TAIs.
- Identifying intelligence collection requirements.

GOAL = Identify HPT; determine intelligence collection requirements

a. Representative questions for determining adversary COA options (based on previous analysis, to include terrain, weather, capabilities, doctrine, tactics, infrastructure, etc.).

(1) What is the adversary's objective in using missiles?

(2) What "wildcard" options might the enemy choose, even if less than optimal?

(3) What are the potential TM operating areas that will permit the adversary to meet these objectives? (NOTE: These become NAI.)

(4) What is the most likely COA the enemy will chose? What is the least likely?

(5) What are the enemy TM forces' vulnerabilities and exploitable decisive points? Of the HVTs, which ones are HPTs?

(6) Using doctrinal templates, terrain data and known tactics, where will various elements of the TM system likely be located (FOB, FOL, Transload site, hide sites, launch sites, etc.)? (NOTE: These become TAI if designated as a HPT.)

(7) Where and when will HPTs likely appear in the most likely COA?

b. Representative questions for determining employment of ground collection assets.

(1) Within each likely operating area, what are the best locations for placement of SOF teams? For example, high points with good concealment and line of sight to multiple avenues. (NOTE: SOF personnel will perform this analysis.)

(2) What are the best locations for emplacement or aerial delivery of UGS? For example, vicinity estimated key LOC used by TELs and GSE. Is there sufficient ground cover to aid concealment? Is this position likely to be disturbed (road shoulder, bypass area, drainage conduit or flood zone, etc.)?

c. Representative questions for determining countermobility targets.

(1) From examination of the TM mobility network, are there any choke points (bridges, narrow passes, cliff roadways, tunnels, etc.)? Can any of these points be interdicted with little possibility of immediate bypass? How can these points be interdicted? Will interdicting these points disrupt the launch operation or simply delay future launches?

(2) How will the enemy TM force react to the disruption of the mobility network? How quickly can the adversary overcome this obstacle? What new TAIs and collection coverage is required to observe these changes?

Appendix D

THEATER TARGET DEVELOPMENT MODELS

TMD is a theater specific task. The manner in which each theater organizes forces to conduct these operations will differ by the forces available and the nature of the threat. This appendix discusses a variety of models in use in theater and component operations.

1. Consolidated Model – US Pacific Command (USPACOM) (7th Air Force Executive Agent)

a. The US Forces Korea (USFK)/CFC possesses an integrated TMAE. Within the element there are essentially six cells: Targeting, Command and Control Warfare (C2W), WMD, Threat Missile Analysis, CM, and SOF. All these cells are collocated in one central area to facilitate the JTMTD process and are responsible for the following:

(1) Targeting cell is responsible for developing a TM attack strategy and integrating targets that meet these objectives into the analysis process.

(2) C2W cell is responsible for developing targets against the enemy's command and control architecture.

(3) WMD cell serves as NBC subject matter experts and is responsible for developing the NBC threat course of action, incorporating weather effects on the enemy's use of NBC, and monitoring the NBC situation.

(4) TM Analysis cell is responsible for developing the TM IPB and serves as the subject matter expert on the different types of threat TM systems and operations.

(5) CM cell is responsible for submitting collection requirements, preparing RFIs, monitoring collection activities, and coordinating with the SOF LNOs to request special reconnaissance.

(6) SOF cell. The SOF LNOs coordinate with the rest of the SOF community regarding team locations, daily mission types, and priorities. (There are two SOF LNOs, one Army and one Navy, in this organization.)

b. USFK/CFC assets and capabilities include TCTA, ground station module (GSM), Joint STARS workstation, CTAPS, ASAS, GALE, TADIL A & B, GCCS, and Expert Missile Tracker and the numerous capabilities provided by the Korean Combined Operations and Intelligence Center (KCOIC).

c. The 32d Army Air and Missile Defense Command (AAMDC - see description below) deploys liaison officers to the 7th Air Force TMAE as well as the Joint Air Operations Center (JAOC) to facilitate cross-component integration. Moreover, upon request of the Combined Forces Air Component Commander (CFACC), the Commanding General, 32d AAMDC,

serves as the Deputy Area Air Defense Commander for TMD (DAADC-TMD), supervising all TMD activities on behalf of the CFACC/7th Air Force Commander.

2. Collaborative Model – US Central Command (USCENTCOM)

a. USCENTCOM follows the organizational structure of a J2/J3. The TMD cell operates under the supervision of the J3 and serves as a principle adviser to the JFC and JTF staff on TMD issues, primarily those related to active defense. This group is concerned with air defense operations, which includes the monitoring of Patriot brigade movements, PATRIOT air defense coverage, the air defense plan and DAL, and Patriot missile logistics. The Theater Missile Team operates as the cell within the J2 for coordination of IPB, CM, and TM target nominations to the JTCB. The TMD cell and Threat Missile Team are not physically collocated but reside in the JOC and JIC respectively.

b. Development of intelligence for attack operations rests in great part within the respective component's intelligence centers (Navy SUBPLOT; Air Force intelligence, surveillance, and reconnaissance [ISR] team; Army Analysis and Control Element [ACE] and AAMDC [defined below]). Collaboration is accomplished through verbal communications. USCENTCOM's assets and capabilities include TRAP, 5D server, Joint STARS MTI monitoring, GCCS, and GALE. USCENTCOM provides the IPB on the strategic TMD infrastructure such as FOBs, LOC, SSM manufacturing plants, chemical munitions plants, SSM training locations, and pre-conflict significant events to a subordinate JTF or component commanders.

3. Deployable TMD Operation Centers – US European Command (USEUCOM), US Air Force JAOC, US Army Air and Missile Defense Command

a. USEUCOM

(1) HQ USEUCOM has developed a deployable, centralized operations and intelligence cell to coordinate and execute TMD (commonly referred to as TMD-in-a-Box). The TMD cell is equipped and basic cadre provided by the Operations Directorate, Command and Control Division (ECJ36). When activated and deployed this cell augments the combined/joint task force (CJTF) to facilitate TMD operations. The cell's mission is to facilitate defense of critical assets from theater missile threats and neutralize enemy weapon systems and support infrastructure. Positioning the TMD cell is dependent on the conflict environment, available communications infrastructure, available space, and mission focus. There is no intent to habitually associate the TMD cell with any particular component; rather, training and exercises focus on augmenting any component, with linkages to the other components' key systems and functions. Data links into the cell provide intelligence and targeting data, missile launch detection (for passive defense warning), an integrated battlespace picture, and terrain/cartographic data. Current manning for the TMD cell is primarily composed of component systems operators assembled around a core of USEUCOM staff representatives. As necessary, component operations and intelligence representatives assist in cell functions.

(2) The TMD Cell interfaces with the Area Air Defense Commander (AADC) through collocation or by voice/data link (depending on Cell location) providing required

information to facilitate C2. In the USEUCOM AOR, TMD attack operations are referred to as "counterforce" operations. Using the available intelligence and operations information; the cell performs analysis, prediction, detection, and target production functions. The TMD cell focuses on short dwell targets (TM TSTs) because of the associated difficulties in prosecuting them. However, established procedures and linkages are equally effective for targeting long dwell, infrastructure, or preemptive targets.

b. US Air Force JAOC. When the Air Force Forces Commander (AFFOR) is designated the JFACC, he will form a JAOC to plan, direct, and exercise C2 of joint air operations in support of the JFC's operation or campaign plan. In this capacity, the JAOC will maintain visibility on the theater/JOA-wide attack operations effort against TMs. Dependent on the contingency and the theater, and whether the mission involves war or military operations other than war (MOOTW), the composition, organization, and functions of the JAOC will be tailored to meet the mission. The basic framework of an AOC still applies.

(1) Combat Plans Division (CPD). The CPD is responsible for planing "future joint air operations." The CPD normally develops the joint air operations strategy and air apportionment recommendation and produces the joint ATO. In support of ATO development, CPD coordinates with the combat intelligence division on the adversary's current and future force structure, capabilities, and intentions.

(2) Combat Operations Division (COD). The COD is responsible for monitoring and executing "current joint air operations." Actions and decisions that apply to the current ATO period are executed through the COD. The COD normally assumes responsibility for the joint ATO as soon as it is released.

(3) ISR Team. The ISR team supports core divisions in the AOC by providing intelligence. ISR personnel working in the CPD normally perform collection management, intelligence production, and target intelligence functions for production of the ATO. ISR personnel working in the COD support the execution of the joint ATO, monitor ongoing missions, and respond to the fluid battlefield situation by providing near-real-time intelligence from all sources. They also provide indications, warning, and situation intelligence to designated users throughout the range of military operations.

c. Army Air and Missile Defense Command (AAMDC). The AAMDC is an Army organization that performs critical theater level air and missile defense planning, integration, coordination, and execution functions for the Army Forces Commander and Joint Forces Land Component Commander (ARFOR/JFLCC). The AAMDC will coordinate and integrate the four operational elements of theater missile defense to protect contingency, forward deployed, and reinforcing forces as well as designated theater strategic assets. The AAMDC commands the echelon above corps (EAC) ADA brigades and other assigned forces.

(1) The AAMDC is based in CONUS and falls within the authority and under the operational control of a designated senior headquarters (US Forces Command - FORSCOM). Subordinate elements can be forward deployed as the political and/or strategic environment dictates.

(2) When the AAMDC is deployed to a theater of operations, the commander will perform the functions of Theater Army Air Defense Coordinator (TAADCOORD) and DAADC as required. The TAADCOORD/DAADC ensures Army air and missile defense is integrated with counterair and active defense operations and planning at the theater level. In addition, the TAADCOORD ensures the corps active defense requirements also are integrated. The AAMDC commander may also participate in the JTCB to provide additional TMD focus and expertise.

(3) The AAMDC prepares the TMD annex to the ARFOR/JFLCC's OPLAN and provides the staff and equipment to plan, coordinate, deconflict and monitor the execution of the ARFOR/JFLCC air and missile defense plan during force projection operations. The AAMDC also provides ARFOR input to the AADC's Air Defense Plan (ADP). The AAMDC consists of intelligence, fire support, aviation, special forces, chemical, air defense, logistics, adjutant general, legal, and signal personnel.

(4) AAMDC liaison teams deploy as required to all major theater elements and TMD C2 nodes such as JTF headquarters, JAOC, JFLCC/ARFOR, JSOTF, Maritime Component Commander, and allies to provide coordination and integration of operations.

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- Home Page:
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- Home Page:
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Glossary

PART I—ABBREVIATIONS AND ACRONYMS

A

AA	avenue of approach
AADC	area air defense commander
AAMDC	Army Air Missile Defense Command
ACE	analysis and control element (Army)
ADA	air defense artillery
ADOCS	Automated Deep Operations Coordination System
ADSI	air defense system integrator
AF	Air Force
AFATDS	Army Field Artillery Tactical Data System
AFDC	Air Force Doctrine Center
AFFOR	Air Force forces
AFI	Air Force instruction
AGL	above ground level
AI	area of interest
ALCM	air launched cruise missile
ALSA	Air Land Sea Application Center
AMHS	automated message handling system
AO	area of operations
AOC	air operations center
AOR	area of responsibility
ARFOR	Army forces
ASAS	All-Source Analysis System
ASCM	anti-ship cruise missile
ASM	air-to-surface missile
ATACMS	Advanced Tactical Missile System
ATO	air tasking order
ATR	automatic target recognition
AWACS	airborne warning and control system

B

BDA	battle damage assessment
BM	battle management

C

C2	command and control
C2W	command and control warfare
C3	command, control, and communications
C3I	command, control, communications, and intelligence
C4I	command, control, communications, computers, and intelligence
CA	combat assessment

CALCM	conventional air launch cruise missile
CAP	combat air patrol
CCD	camouflage, concealment, and deception
CEP	circular error probable
CFACC	combined forces air component commander
CFC	Combined Forces Command
CI	counterintelligence
CIA	Central Intelligence Agency
CINC	commander of a combatant command; commander in chief
CIS	combat intelligence system
CJTF	combined joint task force
CM	collection management
CMA	collection management authority
CMO	collection management operations
COA	course of action
COLISEUM	Community On-line Intelligence System for End-Users and Managers
COM	collection operations management
CONOPS	concept of operations
CPD	combat plans division
CRM	collection requirements management
CTAPS	Contingency Tactical Automated Planning System

D

DA	direct action
DAADC	deputy area air defense commander
DAL	defended asset list
db	decibel
DHS	Defense HUMINT Service
DIA	Defense Intelligence Agency
DIRD	Defense intelligence reference documents
DODIIS	Department of Defense Intelligence Information System
DSP	Defense Support Program

E

EAC	echelons above corps
EEI	essential element of information
E/ISAR	enhanced and inverse synthetic aperture radars
EO	electro-optical
E-OPS	engineer operations support
EPW	enemy prisoner of war

F

FBIS	Foreign Broadcast Information Service
FLOT	forward line of own troops

FM	field manual
FOB	forward operating base (JTMD)
FOL	forward operating location
FORSCOM	US Forces Command

G

G2	Army intelligence section
G3	Army operations section
GALE	generic area limitation environment
GCCS	Global Command and Control System
GLCM	ground-launched cruise missile
GMTI	ground movement target indicator
GSE	ground support equipment
GSM	ground station module

H

HE	high explosives
HPT	high payoff target
HUMINT	human intelligence
HVT	high value target

I

IADS	Integrated Air Defense System
IBIS	teractive battlespace intelligence server
IFF	entification, friend or foe
IMINT	imagery intelligence
INTELINK-S	intelligence link - S
IP	initial point
IPA	intelligence production agency
IPB	intelligence preparation of the battlespace
IR	information requirement
ISR	intelligence, surveillance, and reconnaissance

J

J2	Intelligence Directorate of a joint staff
J3	Operations Directorate of a joint staff
JAOC	joint air operations center
JDISS	Joint Deployable Intelligence Support System
JFACC	joint force air component commander
JFC	joint force commander
JFLCC	joint force land component commander
JIC	Joint Intelligence Center
JIPB	joint intelligence preparation of the battlespace
JISE	joint intelligence support element

JOA	joint operations area
JOC	Joint Operations Center
JSOTF	joint special operations task force
JSTARS	joint surveillance, target attack radar system
JTCB	joint targeting coordination board
JTF	joint task force
JTMTD	joint theater missile target development
JTTP	joint tactics, techniques, and procedures
JWICS	Joint Worldwide Intelligence Communications System

K

km	kilometer
KCOIC	Korean Combined Operations Intelligence Center

L

lbs	pound
LLSO	low-level source operations
LNO	liaison officer
LO	low observeable
LOC	lines of communications
LOS	line-of-sight
LTA	local training areas

M

MAD	mutually assured destruction (Historical)
MASINT	measurement and signature intelligence
MAZ 543	Soviet producted TEL
MCCDC	Marine Corps Combat Development Command
MCM	multimedia collaboration manager (JDISS)
MCPDS	Marine Corps Publication Distribution System
MIIDB	Military Intelligence Integrated Data Base
MILSTRIP	military standard requisitioning and issue procedure
MIST	Multiple Input Sensor Terminal
MOOTW	military operations other than war
MSIC	Missile and Space Intelligence Center
MSL	mean sea level
MSTS-A	Multiple Source Tactical System, Army
MTI	moving target indicator
MTTP	multi-service tactics, techniques, and procedures

N

NAI	named area of interest
NAIC	National Air Intelligence Center
NATO	North Atlantic Treaty Organization

NAVSOP	naval special operating procedure
NGIC	National Ground Intelligence Center
NBC	nuclear, biological, and chemical
NDC	Naval Doctrine Command
NGO	nongovernmental organization
NIMA	National Imagery and Mapping Agency
NM	nautical mile
NSA	National Security Agency
NTM	national technical means
NWDC	Navy Warfare Development Command

O

OB	order of battle
OCA	offensive counterair
OPS	operations
OPSEC	operations security
OPTEMPO	operating tempo
OSINT	open-source intelligence

P

PIR	priority intelligence requirements
PSYOP	psychological operations
PVO	private voluntary organization

R

R&D	research and development
RAAP	rapid application of air power
RCS	radar cross section
RDT&E	research, development, test, and evaluation
RFI	request for information
RSTA	reconnaissance, surveillance, and target acquisition

S

SA	situational awareness
SAM	surface-to-air missile
SAR	synthetic aperture radar
SATCOM	satellite communications
SCI	sensitive compartmented information
SCIF	sensitive compartmented information facility
SFLE	special forces liaison element
SIGINT	signals intelligence
SIR	specific information requirement (Army)
SIT	situation (abbreviation)
SLCM	sea-launched cruise missile

SM	support missile
SOCCE	special operations command and control element
SOCOORD	special operations coordination element
SOF	special operations forces
SOLE	special operations liaison element
SOR	specific orders and requests
SR	special reconnaissance
SSM	surface-to-surface missile
SUBPLOT	naval combat intelligence

T

TAADCOORD	theater Army air defense coordinator
TADIL A&B	tactical digital information link-A&B
TAI	target of interest; target area of interest (Army)
TBM	theater ballistic missile
TCTA	time critical targeting aid
TDDS	Tactical Data Dissemination System
TECHINT	technical intelligence
TEL	transporter-erector-launcher
TGO	terminal guidance operations
TGT	target
TIBS	Theater Information Broadcast System
TLAM	Tomahawk land attack missile
TM	theater missile
TMAE	theater missile analysis element
TMAM	theater missile analysis meeting
TM IPB	theater missile intelligence preparation of the battlespace
TMD	theater missile defense
TO&E	table of organization and equipment
TPFDD	time-phased force and deployment data
TPL	time phased lines (Army)
TRADOC	United States Army Training and Doctrine Command
TRAP	tactical related applications
TST	time sensitive target
TTP	tactics, techniques and procedures

U

UAV	unmanned aerial vehicle
UGS	unattended ground sensor
USAF	United States Air Force
USCENTCOM	United States Central Command
USEUCOM	United States European Command
USFK	United States Forces Korea
USPACOM	United States Pacific Command
USSOCOM	United States Special Operations Command

V

V1	World War II flying bomb
V2	World War II ballistic missile
VTC	video teleconferencing capability

W

WMD	weapons of mass destruction
WWII	World War II
WWW	world wide web

PART II – TERMS AND DEFINITIONS

area of interest. That area of concern to the commander, including the area of influence, areas adjacent thereto, and extending into enemy territory to the objectives of current or planned operations. This area also includes areas occupied by enemy forces who could jeopardize the accomplishment of the mission.

area of operations. An operational area defined by the joint force commander for land and naval forces. Areas of operation do not typically encompass the entire operational area of the joint force commander, but should be large enough for component commanders to accomplish their missions and protect their forces.

air-to-surface missile. An air-launched guided missile for use against surface targets.

cruise missile. Guided missile, the major portion of whose flight path to its target is conducted at approximately constant velocity and depends on the dynamic reaction of air for lift and upon propulsion forces to balance drag.

dwell time. The period of time a target will remain stationary or an activity will continue until completed.

ground support equipment. Vehicles, cranes and equipment used to support transporter-erector-launcher replenishment between launch operations. The largest amount of ground support equipment is typically found at the forward operating location and forward operating base.

forward operating base. The theater missile force's main unit supply and storage activity containing warhead, missile and propellant storage sites; transporters and cranes; checkout vehicles; fuel trucks (vehicle and missile fuel); and resupply vehicles and other support vehicles. A forward operating base is normally dispersed and can operate from the field or urban environment, or can be hidden in large buildings or underground facilities. A forward operating base requires robust lines of communications (primarily roads and rails) to support continuous theater missile operations. *Note: This definition describes FOB in support of TM operations, which is not defined in Joint Publication 1-02, DOD Dictionary of Military and Associated Terms.*

high payoff target. A target whose loss to the enemy will significantly contribute to the success of the friendly course of action. High-payoff targets are those high-value targets, identified through wargaming, which must be acquired and successfully attacked for the success of the friendly commander's mission those targets whose loss to the adversary will significantly contribute to the success of the friendly course of action.

high value target. A target the enemy commander requires for the successful completion of the mission. The loss of high-value targets would be expected to seriously degrade important enemy functions throughout the friendly commander's area of interest.

intelligence preparation of the battlespace. An analytical methodology employed to reduce uncertainties concerning the enemy, environment, and terrain for all types of operations. Intelligence preparation of the battlespace builds an extensive database for each potential area in which a unit may be required to operate. The database is then analyzed in detail to determine the impact of the enemy, environment, and terrain on operations and presents it in graphic form. Intelligence preparation of the battlespace is a continuous and iterative process.

named area of interest. The geographical area where information that will satisfy a specific information requirement can be collected. Named areas of interest are usually selected to capture indications of threat courses of action but also may be related to conditions of the battlespace.

target area of interest. The geographical area where high priority targets will appear in the battlespace for acquisition and engaged by friendly forces. Target areas of interest are identified during staff planning and wargaming process. Target areas of interest are used in planning to effect coordination between sensors and shooter.

transporter erector launcher. Transport capable of moving, erecting, and launching a ballistic missile from the carriage with minimal to no ground support equipment assistance. The most common transporter erector launcher is the Soviet-produced MAS-543. Mobile erector launcher refers to a trailer drawn erector-launcher.

theater missile. A missile, which may be a ballistic missile, a cruise missile, or an air-to-surface missile (not including short-range, non-nuclear, direct fire missiles, bombs, or rockets, such as Maverick or wire-guided missiles), whose target is within a given theater of operations.

theater ballistic missile. A missile that does not rely upon aerodynamic surfaces to produce lift and consequently follows a ballistic trajectory when thrust is terminated.

time sensitive target. Those targets requiring immediate response because they pose (or will soon pose) a clear and present danger to friendly forces or are highly lucrative, fleeting targets of opportunity.

INDEX

U

V

W

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